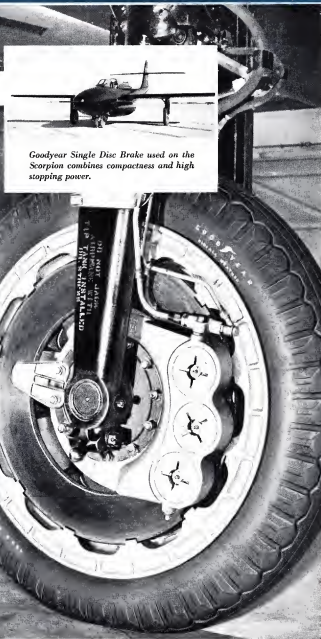


# AVIATION WEEK

A MCGRAW-HILL PUBLICATION

OCT. 17, 1949



*Goodyear Single Disc Brake used on the Scorpion combines compactness and high stopping power.*

## Solution to tire problem XF-89

Powerful, heavy jet fighters like the Northrop XF-89 Scorpion require extra-tough tires with sufficient air-cushioning capacity to safely sustain the landing impact — yet they must be fully retractable within the thin wings. These needs are completely met by use of Goodyear 46 x 9 Rib All-Weather Tread tires. This extra-high-pressure casing has super-thick tread and sidewalls to absorb impact shocks. And it is narrow enough in cross section so that tire, wheel and its powerful Goodyear Single Disc Brake all recess snugly within the wing. For complete information on these time-proved products, write: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.





*Dependable  
controls cost  
less than  
service*



**CREATIVE ENGINEERING**

Makers of the Pelican Mark  
Electronic Altimeter, Fuel Gauges,  
and Turbo Supercharger  
Controls, Standard on Many  
Types of AAF Aircraft

MINNEAPOLIS  
**Honeywell**  
AERONAUTICAL CONTROLS



THE amazing performance records continually being set by advanced American aircraft, and records still to come from designs in the formative stages are more than ever dependent on extreme precision, extra capacity and endurance such as are uniformly characteristic of New Departure ball bearings for aircraft.

*Nothing Rolls Like a Ball*

**NEW DEPARTURE  
BALL BEARINGS**

NEW DEPARTURE • DIVISION OF GENERAL MOTORS CORPORATION • WATFORD, CONNECTICUT • BEARING IN ALL FUNCTIONAL TYPES



"Without my

## Sperry Gyrosyn

I couldn't  
have won!"



James D'Amico and Mrs. Stewart complete the race. Stewart won the plane.



Navigating solely by dead-reckoning with the Gyrosyn® Compass, Joe De Bona is in the controls of his F-51-C "Thunderbird" set a new race record of 470-136 miles on her in the 1949 Bendix race.

"I was able to 'steer to a degree' with the Gyrosyn® Compass," De Bona said. "After setting the Gyrosyn at take-off in California to insure the best 'take-off heading,' I climbed to 27,000 feet and navigated a great circle course entirely by this instrument. To confirm my 'on course' accuracy, I used visual checks along the way.

"For example, I dead-reckoned about 350 miles to Colorado Springs, and computed a course 10 miles south of the city. It looked like about 6 to 7 miles south when I passed over. Later, my course called for a heading which cut

between Greeley and Ft. Wagon, Indiana. When I got there, I split the two towns accurately as planned."

This transcontinental speed dash tests the skill of the pilot, and the flying ability and stamina of his plane. In winning the 2100-mile race in 4 hours and 16 minutes, Joe De Bona proved that he had both. And in flying at speed where a minute means miles, he was able to prove once again, the importance of precision navigation and the Gyrosyn Compass.

# SPERRY

## GYROSCOPE COMPANY

DIVISION OF THE SPERRY CORPORATION  
3840 ROCK NEW YORK

NEW YORK • CHICAGO • NEW ORLEANS  
LOS ANGELES • SAN FRANCISCO • SEATTLE

Joe De Bona

1949

Bendix Trophy

Winner

## CAA Certification Hit

Long insulating industry opposition to the licensing action of CAA certification requirements on new airplane development is being cut into with outspoken criticism which CAA Administrator Del Bentzel may not be able to ignore much longer.

James Lansing, well-known engineer, is the latest to take a hefty swing at the rule as "a terrible hindrance to be lifted from the back of aircraft development." Not long before, the powerful aviation consumer group, AOPA, lashed out vigorously at the seemingly tactical effort of technical road blocks on development costs.

Engineers developing any aircraft that doesn't exactly fit the Transportation Dept. of CAA conventional aircraft requirements, such as the two-engine, four-place, the Sperry Helicopter, a suitable place, a channel wing plane or any such innovation, have an especially bad time. But the CAA stress analysis requirements on even a relatively conventional aircraft and the corresponding and reports are a very serious factor in the total cost of the airplane's development.

Effect of a new "buyer and builder beware" policy which would eliminate most of the present restrictive requirements, would mean a sensible reduction in the price of personal aircraft, with the consumers quickly meeting out any useful aircraft, the critics of the CAA contend.

## Military Transports

American military transport builders still have some progress to make before they can deliver a transport that will fully meet the six desired characteristics by Military Air Transport Service. Maj. Gen. Lawrence S. Kelle, MATS commander, told the MATS meeting in Los Angeles that MATS has made an evaluation of all existing four engine transports "and those in advanced stages on the drawing board."

"Only one aircraft of the entire group," said Kelle, "achieved a satisfactory rating of 'very good.' Apparently we are just a long way from having available a transport which encompasses all the major characteristics essential to an efficient international operation—reliability or commercial."

Characteristics prescribed include economy at operation, minimum noise, ease of loading and unloading, ease of maintenance, performance, and structural flexibility.

## NEWS SIDELIGHTS

### Atkin on Flying Wings

Chief engineer of A. V. Roe Canada, Ltd., manufacturer of the C-102 Jetliner, doesn't see much likelihood that jet transport flying wings will gain industry favor. Avro's E. H. Atkin says the future straight-winged aircraft will have a serious curricular handicap of ad reversed assembly shape, with thin wings and probably a moderate degree of sweep back. He believes the high degree of penetration required in new jet transports will require greater adoption of any form of flying wing.

### Budget Fight

Oklahoma politics figured in the 40-group versus flying wing fight. Sen. Elmer Thomas (D., Okla.), chairman of the Senate Appropriations Subcommittee on Armed Services, engineered the \$500 million aircraft study in the 1950 fiscal year. Rep. Mike Monroney (D., Okla.), who has served eleven years in the House and is considered a likely candidate to oppose Thomas for the Senate in the next year's Democratic primary, took the lead in the House battle for the funds for the additional study groups.

In a floor speech Monroney pointed out that the Senate Appropriations Committee has "voted by hundreds of millions of dollars the appropriations passed by the House for the civilian agencies and for humanitarian. The only work out made in any departmental appropriation bill for the Senate Appropriations Committee has been made in our defense funds—and those taken out of the fighting forces, airplane procurement, and strategic materials needed now for our airplanes in the event of war."

### Four Election Contents

The completed labor contracts at Boeing, Seattle, may be reflected in the result of four elections to be conducted for Pacific Coast Boeing employees by the National Labor Relations Board before Nov. 7.

Many contracts are in bargaining jurisdiction for almost 25,000 production and maintenance workers between Associated Mechanical Union, Lodge 731, International Assn. of Machinists, and the AFL Transport/General Association Western Local 557. The IAM

group in all four elections however is opposing other union, seeking to take over representation for workers the IAM represented from 1936 until last year. That was when IAM called a five month long strike and a court lost its bargaining rights.

Opposing IAM in other elections are the AFL International Brotherhood of Electrical Workers, the Seattle Professional Engineering Employees Assn. and the Washington State Nurses Assn.

In each election the workers also have the choice of voting for no union. Involved are workers in Seattle plants 1 and 2, the Boeing plant, and Boeing test facilities at Moses Lake AFB.

### Basic Airplane

A lot of 1950 words must necessarily exist in basic conversations between pilots and tower and air-traffic controllers as they speak to the world language, "Basic Airplane."

CAA's psychology study is currently compiling the list using approximately 100 words already found in a host of wartime experiments and listing out the list by analysis of recordings made in CAA towers of conversations between pilots and controllers. Words used and will be evaluated on a basis of how well they can be understood in radio transmission. Any strongly used words which rate low on intelligibility will be blacklisted with avoidance of such words suggested.

International Civil Aviation Organization has asked the U. S. to recommend a standard English vocabulary for use by flyers all over the world, and the CAA study will be expected to be used for this international vocabulary, as well as for standardized two-way even tone radio talking in this country.

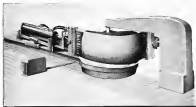
### Airport Aid Extension

Look for CAA to seek extension of the federal airport aid program from Congress beyond the June 30, 1953, expiration date, to keep it in line with other national development policies for highways, railroads, waterways, etc. CAA's new Airport Advisory Committee has already recommended to Administrator Del Bentzel that he ask for its extension. The program through 1953 will not come close to developing the number of airports presently maintained as necessary for adequate overall national coverage (15,000 at least). Currently the airport total in the U. S. is around 7500.



# BATH Rotary Combination SHEET and SHAPE STRETCHERS

Over 30 million lbs. of metal have been  
formed on the BATH Contour Former . . .



One versatile machine  
does stretch and com-  
press forming . . . in  
aluminum, magnesium  
or steel alloys . . .  
from sheets, rolled  
sections or extrusions.

Aluminum sheet being stretched—left  
section is finished (right end line is  
rolled plate material) BATH machine

New Bath Rotary Combination Sheet and Shape Former set up  
for stretch. Provides single-roll forming action, regardless sheet  
handling angle working area around die, while die supports  
shape type, quaternary rollers support sheet, rollers  
support work supported from (sheet) metal (steel), side supports.

These rugged and versatile machines offer the solution  
to many otherwise difficult and costly forming  
problems. Forming is extremely accurate—the cost  
is low—controls are simple, permitting one-man-  
operation on all but largest work—full circles, re-  
verse bends and multiple contours are easily formed.

BATH Contour Formers are waiting for . . .

Aluminum Co.	Rockwell International Company
Aluminum Company of America	Rockwell International Co., Inc.
Aluminum Co. of Canada	Rockwell Service Co.
Aluminum Co. of England	Rockwell Steel Co.
Aluminum Co. of France	Rockwell Steel Co.
Aluminum Co. of Germany	Rockwell Steel Co.
Aluminum Co. of Italy	Rockwell Steel Co.
Aluminum Co. of Japan	Rockwell Steel Co.
Aluminum Co. of Korea	Rockwell Steel Co.
Aluminum Co. of Mexico	Rockwell Steel Co.
Aluminum Co. of Norway	Rockwell Steel Co.
Aluminum Co. of Sweden	Rockwell Steel Co.
Aluminum Co. of Switzerland	Rockwell Steel Co.
Aluminum Co. of Taiwan	Rockwell Steel Co.
Aluminum Co. of Thailand	Rockwell Steel Co.
Aluminum Co. of United States	Rockwell Steel Co.
Aluminum Co. of USSR	Rockwell Steel Co.
Aluminum Co. of Venezuela	Rockwell Steel Co.
Aluminum Co. of Yugoslavia	Rockwell Steel Co.
Aluminum Co. of Zaire	Rockwell Steel Co.

Send Government Publications and many others.

The CYRIL BATH Co.  
7245 MACHINERY AVENUE • CLEVELAND 3, OHIO



Sheet metal being stretched—left  
section is finished (right end line is  
rolled plate material) BATH machine



## WHO'S WHERE

### Changes

Clarence J. Martin Co. has just William E. Rogers as complete change of the company's managing director. He was formerly in charge of special weapons department.

As Transport Area added Charles F. Rogers to its research department. He was formerly in charge of special weapons department. He is now in charge of special weapons department.

Donald L. Wegman has been appointed manager of maintenance for Capital Air Lines. He was formerly director of maintenance and overhaul services at Sick Air Corp.

Philip M. Wilson, former vice president of United Air Lines, has been appointed vice president of Western Air Lines. He was formerly vice president of United Air Lines.

### Sales Shifts

Donald F. Powell, former vice president of United Air Lines, has been appointed vice president of Western Air Lines. He was formerly vice president of United Air Lines.

Western Air Lines named Robert K. Voss as vice president of the company. He was formerly vice president of Western Air Lines.

### Elections and Honors

Aspen "Coy" Latham has been elected to the board of directors of Pacific Northwest Airlines, Inc. He was formerly vice president of Pacific Northwest Airlines, Inc.

Col. A. D. Terrell, USAF, received the Distinguished Service Cross from the Army Department of Defense. He was formerly vice president of the Army Department of Defense.

W. G. Lippincott, FAA, was awarded the Distinguished Service Cross from the Army Department of Defense. He was formerly vice president of the Army Department of Defense.

C. J. Johnson, General, was awarded the Distinguished Service Cross from the Army Department of Defense. He was formerly vice president of the Army Department of Defense.

Major Gen. Patrick W. Thibault, USAF, has been appointed by Defense Secretary Louis Johnson as director of the staff of the Marshall Board. He was formerly vice president of the Marshall Board.

Dr. E. K. Y. Coombs, chairman of the Research and Development Board at the Defense Dept., named Philip B. Tinker and William Lippincott as their new and members respectively of the board's Committee on Americanization. Also on the committee are Dr. C. C. Fawcett, Dr. H. L. Eyring.

## INDUSTRY OBSERVER

U.S. Air Force now plans to make a new evaluation of primary tests after placing small service test orders for the F-101, T-33, B-57, T-34, Douglas T-38 and T-38C. This will be the third evaluation of these models for use of the most hotly contested contracts in USAF primary history. Fawcett was given the nod for an order of 100 T-33s out of fiscal 1950 funds but that decision has now been rescinded in favor of the new competition.

F-101's do not aircraft manufacturers are now working on a USAF proposal for portable field maintenance structures to shelter maintenance workers on military aircraft of all sizes. USAF wants these structures to replace early and badly-held hangars at advanced bases. Lockheed, Republic, Boeing, Convair and Curtiss-Wright are preparing design proposals.

Curtiss-Wright airplane division at Columbus has a contract with USAF to study the capabilities of military aircraft in withstanding the stresses imposed by hypersonic engines. Curtiss-Wright will use a Lockheed F-84, Republic F-84, North American F-84 and Boeing B-50 in its structural tests.

Pittsburgh Aircraft Ltd.'s new anti-submarine plane (Type 17) is the first plane to use the double turbojet for the operational main function. The Armstrong Siddeley Motors Ltd. Double Mustang develops 2000 horsepower by use of its two-way jet. The aircraft has a high-speed, independent fuel and propeller controls and each drive one of two counter-rotating propellers. Both Mustangs are used for take-off from a carrier deck, with normal cruise powered on a single jet for fuel economy. Both jets can be used when top speed is required to close with a target. Similar principle is used in the Albion F-40 turboprop now being utilized in the Canadian CF-101 Navy flying boat project.

Cowara's delta wing XF-92A research plane may give Capt. Charles E. Yeager another surprise. The Yeager was the first pilot to hit supersonic speed in the Bell X-1, is now putting the Cowara delta wing through its paces for the USAF since it needed a maximum of Mach 6 during company tests. Use of the subsonic on the Albion F-40 turboprop may provide sufficient power to push the XF-92A to supersonic speed.

Armstrong Motors Corp. of Yonkers, N. Y. has developed a new method to compound greatly resistant to the high temperatures of hypersonic and rocket engines. The compound can handle and armor and was developed under contract for the Office of Naval Research.

De Havilland is now in process of completing U.S. certification for its eight-passenger, twin-engine Doves transport. Biggest problem was oil temperature during single engine failure. New evaluation has been submitted on the Gipsy Queen engine. De Havilland is moving at the executive transport and executive market in the U.S. Nearly 300 commercial versions of the Dove have been sold to date.

CAA is completing plans to make tests covering the effects of humidity as well as temperature accountability, on transport aircraft performance during all aspects of the climb and cruise. The tests probably will be conducted with a DC-4. Air Line Pilots Ass. strongly favors the contractors.

CAA and CAA are weighing the advisability of requiring basic new effective pressure gauges in transport category aircraft to facilitate engine checks and provide a more accurate means of measuring engine power output. The International Civil Aviation Organization's newstandards division has emphasized the need for BMEP gauges or similar devices. CAA and CAA aren't making plans for a new regulation because they feel present BMEP gauges do not have the reliability that would be essential for the dependence that would be placed in the device.

## Navy Berates USAF Concept of Air Power

Inter-service row at white heat as admirals, backed by Marines, have "day in court."

By Robert Rouse

The Navy leveled its biggest guns on the Air Force last week in a heavy barrage of argumentative statements before the House Armed Services Committee aimed at the following targets:

- **The Carrier B-36:** Intercontinental Bomber—Navy spokesman claimed that the B-36 is a 1944 vintage airplane that carries 8, 10,000 miles and a million target loads 40,000 ft. and is a "Jules and Jim bomber."

- **Strategic Airpower:** Navy admits blanket strategy as well as a specific bombing area subject of debate that "is infinitely assessed, monthly revised and hounded to the shrines of the past war."

- **USAF Tactical Airpower:** A Marine general charged that USAF tactical air power is too small and inefficient to provide support of ground troops equal to that offered by Marine and Navy actions.

- **The Prime Department:** Navy, at month's end, testified that three years were not being given adequate weight by the newly reorganized Defense Department and that demands for the Navy were being made by people who did not understand Navy affairs.

Navy division against the Air Force flared with a tremendous blast by Admiral Arthur W. Radford, Pacific Fleet Commander and longtime critic of the Navy's position. Radford disagreed violently with the manner in which USAF high command was running the Air Force.

- **Radford Charges Specifics:** Radford charged that the USAF made a "Jules and Jim bomber" in getting the B-36 for intercontinental zone bombing.

He claimed that the 10,000-ton range of the B-36 was not required for an attack on Russian targets. He urged the Air Force to be content with its assigned order for 100 B-36s and not replace B-29s to take care of any emergency while "they might break their backs to develop the range and other performance" of the Boeing B-47 and Northrop B-49 jet flying wing.

Radford said that the B-47 was previously conceived to be the most advanced bomber design flying in the world today. He said it was more important to develop a structure, incorporating all of its range than its ability to replace that had long range at the expense of other performance characteristics.

- **Points on B-47—Rep. Paul E. Patton (D., Tex.)** pointed out that the B-47 had not progressed from prototype into the production stage and that while the Air Force was planning large scale B-47 production, Strategic Air Command group had indicated that the B-47 would be like it we had air lines in Poland.

Radford also urged that the Air Force devote more of its production program to high performance fighters. He said the "same evidence of the General Air Force was its failure to develop superior fighters."

- **Strength of Bombers:** After earlier testimony that the Air Force might let the doctrine of a "clump and over-throw" through atomic bombing, Radford said he agreed with Air Secretary Douglas H. Sweeney on the role of atomic bombing in the defense plan but felt Sweeney had made a mistake in overlooking the B-36's ability to deliver the bomb. Radford said he felt that USAF did not have adequate representation to make a proper evaluation of the B-36.

I felt this should have come to the Navy and asked us to help them make the evaluation," he told the committee. Radford said he was aware of most USAF aircraft fight tests but that all of the engineering analyses made by Naval aeronautical engineers for the committee were based on information published in aviation trade journals.

- **Navy Bids for Defense:** Radford, civilian head of the Aviation Design Research branch of the Navy Bureau of Aeronautics presented a chart purporting to show that the maximum strike range of the B-36 is 10,000 miles and required a bomb load was 10,000 lb. Sweeney testified some weeks earlier that a B-36B had flown more than



RADFORD—Pacific fleet commander



SWANEY—No match for fleet bombers

10,000 mi. (about 10,000 mi.) and dropped a 10,000 lb. bombload at the end of its run.

The USAF did not furnish the Navy with all the latest information on the B-36, Radford claimed. Sweeney had earlier testified that he obtained permission from the then Defense Secretary James Foran to withhold such information because it was being leaked to the press in distorted form. Radford said that action indicated a lack of control over the press at the Air

Force. He said the Navy might want to use the B-36 for reconnaissance or other purposes as it has a right to know what the B-36 can do and how it fits into Navy plans.

- **Brooklyn Question—Rep. Stephen Brooks (D., La.)** asked Radford, in light of his attack on strategic bombing, if he considered the new bombing of the last war.

"I condemn it on the basis of what I have learned since the war," Radford replied. "I did not feel that was during the last war. I condemn it on the basis of studies I have made and material that has been available since the war. My own experience has come from the study of the problems this nation faces in Germany and Japan since the war."

- **House Effort—Radford** admitted an error in questioning that the Navy had made attempts to present its needs for the fiscal 1950 budget (the first under the Unification Law) and the decision made on that budget in the Defense Department was that the Navy had not made a case for itself. He said the budget group's decision showed it made a very honest effort to arrive at a satisfactory solution.

Radford said, however, that were not in a position to evaluate Navy policies.

"The most of the Navy's problem," Radford stated, is that "the Navy has been unable to create, in strategic planning, an understanding of the time we have had to choose their problem with one more order service and some of the civilian executives."

- **Ministry Problem:** Our deliveries from the Navy, he said, are a security which have a very different job and are only second when we deal with people who have a better understanding than they have of what we are asking them to do.

Rep. Admiral Ralph A. Cator, Naval member of the Strategic Bombing Force, charged that strategic bombing in World War II did not have a direct effect on the outcome of the war.

He charged that even under the most ideal conditions in the air attacks on Japan where only shallow penetration was required against a weak, defenseless force, "the long range, uncorrupted bomber (B-29) was handicapped with a mission beyond its capabilities."

- **Infant Stride—Officer** charged that the Strategic Air Force, which has key personnel within USAF, "cannot be a unit part of the fighting force that we need today to meet the potential Japanese attack, of an enemy's naval attack."

"The present concept of strategic bombing is no more urgent than the need to move at this time," Officer said, "not alone because of the recent information from abroad but also in its relation to



NAVY'S SKYKNIGHT: Second night interceptions down 40,000 ft.

the European military and program."

- **Deserted Theme:** "Most air action is a major element of our military power a force which needs on fighting the war in its own way and capabilities, outside anything to the vital minimum number of ourselves and our allies. Most the United States cannot, as our product because certain units grouped by the defense navy crew, up and about to strengthen the defense of the United States. Most on the basis of the United States of World War II, only a personnel concept merely to avoid clearing the prestige of the navy, who has at down the strong road in the past."

Officer said the Navy is not attempting to establish an strategic bombing functions because it believes strategic bombing as practiced in the past is both militarily essential and usually wrong.

- **Frontation Record—Inspector** Gen. and Marine Major, Assistant Director of Marine Air Force, told the committee that tactical bombing in strategic air power was the decisive factor in both the European and Pacific wars. He charged that the aerial of Air Force Air Force cooperation during the early part of the war was "single one of frustration and disappointment by the ground forces."

"There is, now, the primary concern of the Air Force high command was with the theory of independent air operations," Major claimed. "Tactical support for the Army was given by service in a third priority manner but

very little real effort was devoted to combined training. As a direct result of this, the North African campaign was definitely retarded by the inability of the Army and Air Force to work effectively together."

- **Reasons Theme—Major** also said the Air Force still lacks an effective air ground control system. Major and the Personnel staff a variety of close air support units in that need by the Navy in the Pacific and pointed out that 17 of the 14 Air Force air units reported tactical support and that even the remaining air units of nuclear bombers is designed merely to extend the range of tactical support.

The Marine general asserted that USAF planning for tactical support falls far short of the actual data. He questioned the Army and said that the Air Force is asked to produce in order at battle in evidence seems to be that the congressmen could see the inadequate role allocated tactical air power.

Major also said and Air Force tactical units are not being properly trained for their assigned missions.

- **Air Force Parade:** A study done by private Navy sources revealed to the committee that to support Admiral Radford's claim against the B-36. This included:

- **Capt. Frederick M. Taggart,** veteran Naval test pilot and fighter expert and now chief of staff in the Naval Air Experimental Station at Patuxent, Md. Taggart claimed that two McDonnell F2H-2 twin jet fighters were a match for a B-36 and three B-36s would certainly defeat the bomber. He urged the Air Force to test B-29s in the role of the B-36, because larger numbers of B-29s would enable

situation of severe defense. "If the B-29 is in the role as an observer as a B-16 at 40,000 ft., Taggart believed, real world use B-36s during and winning all around us and making repeated gunnery attacks with a speed advantage of over 100 mph. You might notice the movement of the fighters was more deliberate than in aerial attacks, that they turn are not so sharp and that they do not attack,

### More AF Contracts

As a sequel to the list at Air Force contracted contracts of over \$100,000 placed in this publication Oct. 5, *Aeronautics Week* has the most contracts placed \$10,000 to \$100,000 for the month of August, latest made available by the USAF. They start on page 41.

have inadequate or directly overhead, that they do have the ability to make coordinated attacks from all air bases including those most favorable to the fighters.

"They have in fact the same superiority over the bombers as the fighters had over the fighters in World War II. When these bombers were used, it was to attack the fighters, not the fighters themselves," says Leonard.

• **Costs.** William Leonard, commander of F-4 Phantom II squadrons with Bombers believed that the altitude above 40,000 ft. is the most economical operating area for the Phantom and that it is now operating routinely at that level. He said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36. Leonard said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36. Leonard said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36.

• **Costs.** William Leonard, commander of F-4 Phantom II squadrons with Bombers believed that the altitude above 40,000 ft. is the most economical operating area for the Phantom and that it is now operating routinely at that level. He said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36. Leonard said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36.

Marine said the night fighter version of the Phantom (F-4H) will be delivered to the Navy and play an important consideration for a night fighter version of the Phantom. Leonard said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36. Leonard said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36.

Marine said the night fighter version of the Phantom (F-4H) will be delivered to the Navy and play an important consideration for a night fighter version of the Phantom. Leonard said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36. Leonard said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36.

Europe are currently short during the winter.

• **Costs.** William Leonard, commander of F-4 Phantom II squadrons with Bombers believed that the altitude above 40,000 ft. is the most economical operating area for the Phantom and that it is now operating routinely at that level. He said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36. Leonard said that Phantom squadrons had made numerous interceptions and gunnery runs at targets above 40,000 ft. involved by Phantom Phantom which is both smaller and faster than the B-36.

## Scant Hope for 58-Group AF

Prospects for a 58-group Air Force program that was, despite support in the Congress, faded last week. The House Appropriations Committee has doggedly insisted on a maximum program of 45 groups, apparently not to vote on the program.

At stake in the fight was \$799,822,000 (\$522,267,000 cash and \$277,555,000 contract authorizations) for the 58-group program for the 1970 fiscal year. The House originally approved a \$799,822,000 (\$522,267,000 cash and \$277,555,000 contract authorizations) for the 58-group program for the 1970 fiscal year. The House originally approved a \$799,822,000 (\$522,267,000 cash and \$277,555,000 contract authorizations) for the 58-group program for the 1970 fiscal year.

This supports the Administration's program, although it was to be a maximum of 45 groups, not 58. The House Appropriations Committee has doggedly insisted on a maximum program of 45 groups, apparently not to vote on the program.

The House voted 307 to 10 to stress its confidence to stand pat. The House followed two hours of lively questioning by congressional military leaders including as power as the nation's first law of defense, as well as officers. Rep. George Miller (D, Cal.), chairman of the House Appropriations Subcommittee on the Armed Services, said that the House Appropriations Committee has doggedly insisted on a maximum program of 45 groups, apparently not to vote on the program.

budgetary matters from the fighter's side. McNamara also testified that the British Phantom and Phantom are capable of making successful interceptions of the B-36.

He said the Phantom has a standard fighter defense system, partly because it is independent of the Phantom Air Force and is responsible only for the defense of the country. McNamara said that only one Phantom was lost by the Phantom Air Force, and that the Phantom Air Force was a success in its mission and success with acceptable losses.

quoting was made by Rep. Fred Marshall (D, Minn.), a former scoring his first term.

• **Imposed Funds.** But then, Sen. the Appropriations Committee decided to use a subcommittee to make with the President to make a decision whether he would agree to imposed funds for the two additional air groups, if the Senate considered it in the House budget. This strategy was announced by Sen. Oliver Thomas (D, Ohio), chairman of the subcommittee, in a statement.

The subcommittee consisted of Sen. Kenneth McNamara (D, Tex.), Sen. Stuart Symington (D, Mo.), Sen. Kenneth Wherry (R, Neb.), Sen. Charles McNamara (R, D.C.), in addition to Thomas, who heard the subcommittee on Armed Services. With that, the House Appropriations Committee has doggedly insisted on a maximum program of 45 groups, apparently not to vote on the program.

What the Congress rejected was the House's confidence to stand pat. The House followed two hours of lively questioning by congressional military leaders including as power as the nation's first law of defense, as well as officers. Rep. George Miller (D, Cal.), chairman of the House Appropriations Subcommittee on the Armed Services, said that the House Appropriations Committee has doggedly insisted on a maximum program of 45 groups, apparently not to vote on the program.



JOHNSON proposed wholehearted vote first.



McNAMARA's committee showed, still.



McNAMARA's committee showed, still.

## Battle Due On Secret Budget Cuts

Vinson attacks proposal by Defense Secretary Johnson to pare military procurement funds instead of overhead.

A pitched battle between the House Armed Services Committee and Defense Secretary Leon Johnson was brewing last week over Johnson's proposal to pare military procurement funds out of the fiscal 1970 budget.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.

cut each service should share. The agreements worked out to a 5 percent cut for the Navy and a 5 percent for the Air Force and 5 percent for the Army.

• **Navy.** Navy Air-Sea-Force is to be increased from its cut will be shared, but according to McNamara, at this late date in the fiscal year, procurement funds are the only thing left to cut substantially. Admiral Hapwood told McNamara that the Navy had determined to make Naval aviation about 20 percent of the total Navy cut.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.

Johnson's proposal slashes would be from the maximum budget proposed by President Johnson and would cut the Air Force below the 48 groups requested by the President. Naval aviation procurement would take a 30 percent cut. USAF is scheduled to lose \$1.5 billion in procurement funds with the Naval aviation due to drop \$200 million.







## First Details of Avro's Orenda Turbojet

New Canadian engine shows high combustion efficiency, clean design.

By Irving Stone

MALTON, ONTARIO — The Orenda, A V-Ron Canada Ltd.'s new jet engine, gives capable indication that it will meet this paddy its name-flat of the great belief by the horizon to ensure things with power.

For, while no data have been made available, schematics of this turbojet on the test bed—its size and general technical characteristics—make it the one class that it will be in the over-7000-lb thrust category. And it may well be that it will emerge as the world's most powerful jet engine.

Designed and built at the company's Gas Turbine division, the Orenda is dated, ultimately, to power Avro Canada's jet fighters, the XC-160. While it's likely that this craft will take to the air before the year's end, it would not be powered entirely by Orendas, most both craft and engine would be requirements.

►Compressor, Accessories—The Orenda's compressor is unusually clean in length, from nose to end of exhaust case, is approximately 11 ft.

The compressor is a straight-through, axial flow unit, its inlet pipe comes up passing about 6 ft in high.

Design philosophy is, apparently, that the aircraft accessories should have their own gearbox within the engine, with just a drive from the engine. This would simplify "hooking" during engine change.

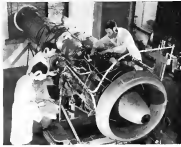
Compressor casing doors close to the rear and thus allows the engine accessories mounted on it to be contained within the largest of the engine—about 14 ft, at the cluster of the 6 combustion chambers.

Length of the compressor section is dictated that it contains a maximum of 11 stages.

►Chambers, Nozzle—Approximately about 14 in in diameter, the combustion unit seems to be the largest yet installed in any turbojet. Length-to-diameter ratio is usually small.

Forward (cool) portion of the combustion chamber is aluminum alloy, aft portion, steel.

After successful test bed running, the expansion joints between chambers and



the nozzle box were exceptionally clean, indicating no gas leakage.

Box after exhaust discharge, it was possible to hold the head on the forward portion of the nozzle box, apparently that section is air cooled. All portions of the box, somewhat better, is probably insulated.

►Supports—Engine supports are located at diametrically opposed points on the sides of the nozzle box forward section, probably because this part is sufficiently cool to allow this use as a structural member.

Supports at the compressor is accommodated via an ingenious angle linkage from a pad on either side to the cooling bottom.

This arrangement would probably allow all four points to take the loads regardless of aircraft direction.

►Clear Exhaust—An impressive feature of the Orenda is the remarkable clarity of its exhaust—no indication of high combustion efficiency.

Flows outside the test house, on an engine start was observed through the muffler attaching to the tailpipe. There was merely an instantaneous puff of flame later at the engine—indication that turbine blade life will be high. No smoke was visible.

This impressive jet points up the high degree of self-sufficiency and design and production perfection attained

through all-Canadian efforts. Considering that it is but their second major venture in the turbojet field, Canadian engineers have given significant indication in the Orenda that there is more to be gained from jet progress.

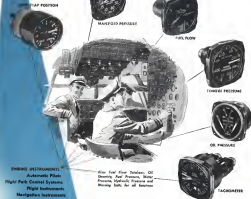
## Pilot Warning Device

A control stick "shaker" designed to give positive warning to pilots flying high-speed military aircraft has been developed by the Safe Flight Instrument Corp., White Plains, N. Y.

Working only 20 in and mounted coaxially around the control stick, the new device imparts an unmistakable shaking motion whenever a stall is approaching. It is said to be more efficient than a horn or red light warning unit, because of the positive motion with leading gas laws and viscous other warning signals in the cockpit.

Operation of the stick shaker is controlled by SFI's potentiometering vane which is mounted on the leading edge of the wing. The sensing vane is designed to detect the approach of a stall under any conditions of load, acceleration or speed.

Signal from the sensing vane actuates a motor in the shaker to drive a gear around the stick column. This gear causes an eccentric weight which produces the shaking motion.



### ONE Source, ONE High Quality, for Virtually Every Instrument in Your Flight Engineer's "Office"

The entire series in the large and complex aircraft of today is the Flight Engineer's Instrument Panel. To assure you the utmost in reliability and accuracy in this vital spot, Eclipse-Pioneer provides precision remote indicating systems for practically every engine function required. Each instrument is an example of the skill and craftsmanship that have built Eclipse-Pioneer's reputation—one of the oldest and finest in the field. When you specify these all-important engine instruments for your plane, give yourself every advantage by selecting Eclipse-Pioneer—one source, one high quality for all.

## ECLIPSE-PIONEER

TEKORNO, NEW JERSEY

Plant Office: South International Building, 74 Pitt, Chicago, Ill. 60601

LOOK FOR THE PIONEER MARK OF QUALITY  
ON ALL OUR INSTRUMENTS



AVIATION INSTRUMENTS



**AMERICAN:** Kollman prototype sextant (left) uses ball-and-socket telescope supporting an arc and base of adjustable intensity. Telescope mounted arc mount (right) allows to rotate roof and normally sealed by clamps. Telescope projects 12 in. above roof.



**BRITISH:** Hughes sextant (left) uses bubble horizon with red-lighting for day and night operation. Telescope like sextant (right) projects about 3 in. above rim of arc. Color picture scaling photo is seen in end position.

## Periscopic Sextant: U. S., British Versions

Fundamental differences of new navigational devices analyzed. Units standard on latest transport types.

Britain and the United States simultaneously have come up with different versions of an astronomical navigation instrument—the periscopic sextant—open to use as standard equipment on the two latest transport types to go into operation in the two countries.

The American unit, produced by the Kollman Instrument Division of the Sperry Gyro Co., 1036 Fifth Ave., New York, is being installed in Boeing Stearman. The British instrument, specified for the Canadair "Four," is made by Henry Hughes & Sons, Ltd., whose agent is British Aircraft Instru-

ments, Ltd., Cranfield Works, London, N.W. 2.

The Kollman sextant has also been installed in Lockheed Constellation by airline operators—Pan American Airways, American Overseas Airlines, KLM Royal Dutch Airlines. KLM also uses the device as a DC-4 wing unit.

Development Speed—Concepts of the prototype sextant, whose development was hastened by a wingman crashing his death when blown through an exploded auto-hatch, is a logical reply to the advent of high-speed, pressurized aircraft.

It eliminates the appreciable pressure drag set up by the astrodome (no longer required), saves weight, does away with transparent optical astrodomes and allows the pilot complete security while he is making his observations.

Furthermore, the installation of the sextant is considerably lighter and simpler structurally, thus providing for its removal.

How Mounted—Both the American and British instruments consist of two separate units—mounting and the sextant. The sextant is built into the upper portion of the fuselage as a permanent fixture, it need not be as the orientation of the aircraft.

The Kollman support consists of a precast mounted ring which allows the sextant to swing in an arc of 15 deg. to

## REDESIGN TRIMS LENGTH 5 1/4 INCHES, CUTS UNIT COST \$5.70



Series 5: Where motor pump uses modified shoulder to position bearing on shaft. 3 Truarc rings hold bearings in housing. Locked bolts secure type holding box that requires periodic tightening.

New design uses 4 Truarc bearing rings (2 external, 2 internal) to push. This shaft carries bearings. Bearing rings provide shoulder of uniform section height. 3 Locking rings secure maintenance-free machined seal.

Redesign with Truarc Rings helps save \$5.70 per unit for Wayne Home Equipment Company, Inc., Fort Wayne, Ind. It gives them a more compact product, eliminates a separate bearing pedestal and a skilled-labor grinding operation. It facilitates use of maintenance-free machined seal instead of old type stuffing box.

Endings with Truarc Rings and you too will not come. Whenever you use machined shoulders, nuts, bolts, snap rings, cotter pins, there's a Truarc Ring that does a better job of holding parts together.

Truarc Rings are precision engineered. Quick and easy to assemble, disassemble. Always circular to give a never-fading grip. They can be used over and over again.

Find out what Truarc Rings can do for you. Send your blueprint to Walides Truarc engineers for individual attention, without obligation.

### REDESIGN WITH 5 TRUARC RINGS GIVES THESE BIG SAVINGS

- Cuts length 5 1/4 inches
- Cuts total labor 15.2%
- Eliminates skilled-labor grinding operation
- Saves 38.3% materials
- Allows use of stock-size shaft, another bearing
- Eliminates separate bearing pedestal

TOTAL UNIT SAVINGS... \$5.70



**WALIDES TRUARC**

RETAINING RINGS

WALIDES TRUARC, INC., LONG ISLAND CITY 1, NEW YORK

Walides Truarc, Inc., 47 11 Avenue Place  
Long Island City 1, N. Y.

AP-101

Please send 20 pages Data Book on Walides Truarc Retaining Rings.

Name

Title

Company

Business Address

City  State  Zip

## engineer's notebook



### FOR VENTILATION DUCT JOINTS

Marmen V-bend couplings provide an effective and economical method of sealing flexible joints in an air conditioning system.



### ATTACHMENT OF FAIRING

Marmen straps provide an easy method for supporting fairing from the hydraulic strut itself...an excellent means for holding hydraulic lines in place as well.



### HEAT CONTROL UNITS

are easy to remove for service when secured with Marmen Straps. Installation of many accessories can be simplified by using Marmen bracket clamps and straps.



*Save cost and design time with Marmen*

FOR INFORMATION WRITE DEPT. M-30

THE M&M GROUP, HEAT, AIR, AND COMFORT

**MARMEN**  
PRODUCTS CO. INC.

140 WEST FLORENCE AVE.  
INGERSWOOD CALIF.



comparatively for variations in the attitude of the aircraft and to facilitate location of stars.

The Hughes unit has a ball socket arrangement for a swing of 8 deg.

Both instruments may be rotated 360 deg. to azimuth.

Each instrument is provided with a shutter flash with the flashing disk, actuating the sensor when the sextant is not in place. The shutter is controlled by a lever attached to the mount and when the sextant is placed in position, no appreciable loss of precision is evident.

Portion of the Kofman principle extending into the instrument measures 14 in. in diameter, 24 in. in length, while star dimensions for the Hughes unit are 24 and 3 in. respectively.

**► Lookers, Magnification.**—Both instruments are equipped with an azimuth scale. The Avastar unit has an independently movable compass unit marked off in increments of two degrees. There are two scales—one fixed, directing the plane's heading, the other movable with the sextant, indicating the direction of the observed body. Mounting of the sextant thus permits determination of both the relative or true bearing and also the attitude of a celestial body. The Hughes instrument operates in exactly the same manner.

The Kofman sextant has a two-power magnification with a true field of 15 deg., while the Hughes device has a magnifying power of five and a 75 deg. field. It has been suggested that a flat viewing port be incorporated in the fuselage adjacent to the sextant, thereby providing a means for screening the horizon to select stars to be used as references.

**► Observations.**—With the American instrument, observations may be made at any angle between -10 and +92 deg. in elevation, while coarse and fine adjust screws (15 and 3 deg. per revolution, respectively) are provided for rotation of the plane.

The original counter showing the altitude in degrees and minutes, at first gave trouble, but this has been remedied by substituting a mechanism of Kofman manufacture.

The eyepiece is adjustable from -2 to +3 diopters and eight filtering glasses of varying values are provided to reduce the sun's brilliance, as required.

The British instrument differs in that the scale is controlled by a 10-deg. adjustment and a fine altitude control extending over about 14 deg. selected in either direction at two speeds via a servo motor operated by a rocker bar.

First the navigator can "check" his bubble manually by adjusting the position on the scale bar with his first and second thumbs, and second, accuracy of setting coincident between object and bubble is achieved.

(Continued on page 26)

## POWY Fuel Pumps

for Gas Turbines



POWY CORPORATION 35 BEAVER STREET • NEW YORK 4 • N.Y.  
POWY EQUIPMENT LIMITED • CHELTENHAM • ENGLAND  
POWY EQUIPMENT OF CANADA LIMITED • ST. CATHARINES • CANADA

# the Clary custom for dependability



## NUTS FOR AIRCRAFT

...another Clary specialty... supplied in all types, sizes and quantities with exacting attention to AN Specification.

complete stocks  
all sizes  
all types  
any quantity  
one-stop purchasing  
packaged to your specifications  
all parts tested in  
Clary's own laboratory

For further information... write, wire or phone

# Clary

MULTIPLIER CORPORATION



**AIRCRAFT  
HARDWARE  
DIVISION**

serving the aircraft industry since 1911

Shades can also be provided to reduce the brilliance of a bright lighting system.

► **Horizontal Reference**—An interesting feature of the Kolman system is the incorporation of a small (1/2 in.) stainless steel mirror which, by reflecting light directed to its surface through a mirror, red-colored slit to a beam-splitting pellicle and thence to the eye piece, establishes the horizontal reference line instead of the conventional bubble.

The mirror, balanced on a concave pivot, automatically returns a correct slit when pendulous action causes it to assume a horizontal plane. Entire unit is in a housing containing shocks oil for damping purposes.

The horizontal reference appears on the field at a red line of variable intensity subtending about 3 deg. long and 1 mm. in diam. The straight horizontal line greatly facilitates accurate collimation and obviates the need for an eyepiece. Also, as parallel lines between the reference and the observed object.

In contrast, the Hughes unit is equipped with a bubble horizon which gives such constant service in the Mark V sextant. It is illuminated by two types of lighting. One, for use by day shows a black bubble on a bright field; the other, for night use, shows two red spots in a straight line. When using the latter type, the star is sighted in the eyepiece straight line joining the two red spots.

► **Integrating Mechanism**—A Dorel Black integrator is incorporated in the body of the American sextant. This mechanism effects a continuous, moving average over an observation period so as to average out all effects of shifts of the horizon lighting system.

One advantage of this integrator is simplicity of operation—a single lever sets and reads the unit and there is no continuously integrating attitude against elapsed time. It may be stopped at any time short of the two minute cycle and the average attitude for that period is obtained directly from the counter.

A dial graduated in seconds indicates the full time of the observation, which indication may be added directly to the time of star to give the stars time in the reverse chronicle. The counter also indicates the elapsed time of observation to an accuracy of one second or better.

The British instrument mechanism functions in very much the same manner so that it is also equipped by a single lever which sets the unit free from to complete a full observation cycle and gives average altitudes for periods up to two minutes. It is powered, however, by a constant speed electric motor.

► **Molman Control**—Type of the Molman sextant is fitted with six air and humectable sealed to prevent condensation when the top is extended into the

atmosphere. As a further precaution, a small amount of silica gel within the tube is visible through the prism window to indicate moisture.

The optical system within the tube is supported independently, thus protecting it from shock and mitigating the effects of changing ambient temperatures.

In guard against condensation and staining to the Hughes unit, a heating coil is fitted inside the top of the prism tube. Temperature is controlled by a thermostat.

Although neither of navigation to the Hughes instrument is not known of the sextant, those who have used the Molman instrument are enthusiastic over its ease of operation, half an hour being considered adequate to become thoroughly drilled and on its use.

Undoubtedly a great deal to the man who uses it in that used for an extra few parts is eliminated. This will not only facilitate the navigator's job, but will also permit him to perform his work more rapidly, of increasing importance as speed of aircraft grows towards the supersonic-GC.

## British Starter For Turbine Engines

A high-power output starter—Type E.S.C. 30—for cranking a turbine on gas to starting speed in a reasonably short period has been developed by Percy Cox Ltd., Hales, Essex, England. Weight of the unit is 30 lb.

Designed to give approximately twice the output of the company's L-type unit for piston engines, the turbine starter burns 15 times the available amount of the latter's centrifugal charge over a working period of two seconds, affording a maximum energy output of 10,000 ft. lb.

The starter carries an cartridge built in a modular design. Two cast rings are fixed automatically through sockets at opposite points. The high temperature, high velocity part is directed to a turbine wheel which, having two contra rotating wheels with six starter blades between them.

A reduction gearbox combines the motion of the counter-rotating shafts and brings peak speed of the output shaft to 18,000 rpm, against a corresponding wheel speed of 90,000 rpm.

A multi-plate clutch in the final drive shaft absorbs peak loads during engagement. To render the starter safe in event of failure of any part of the drive, an over-speed device limits rotor speed.

Labouring of bearing and gear teeth is a built-in guard. At each start, the pump meters the required quantity of oil from the main turbine engine.

## Anti-Corrosive STAINLESS STEEL FASTENINGS

DO THE JOB Better



7000 ITEMS IN STOCK

Aircraft Fastenings to A-N & Sport Specifications

- Nuts
- Bolts
- Cap Screws
- Machine Screws
- Nails
- Self Screws
- Pins
- Rivets
- Sheet Metal Screws
- Washers
- Wood Screws



**A Note on Your Interlock Brings YOU This Outstanding Reference Catalog**  
Called by many as the "Bible of the Stainless Steel Fastening Industry," Anti-Corrosive's new catalog gives a complete listing of more than 8000 items in 110000. Send us a note on your interlock request by Catalog 406.

**Anti-Corrosive**  
Metal Products Co., Inc.  
Manufacturers of STAINLESS STEEL FASTENINGS  
CASTLETON ON HUDSON, NEW YORK



## Torrington Needle Bearings

### handle heavy loads in minimum space in Republic F-84 Thunderjets



Higher flying speeds mean greater bearing loads. The Republic F-84 Thunderjet was chosen in developing the F84D Thunderjet, that 800 mph fighter. In Torrington Needle Bearings, Republic secured the very performance and life expectancy needed for its important necessities.



Little room for error in life for a large in scope in load and a long vibrant life in load. Comparison of such units in the Torrington Needle Bearings assembly shows a standard Needle Bearings assembly. Large shafts in relatively small bearings providing great life in minimum space.



Bolder point application of Needle Bearings shows the full complement of small diameter rollers. These element bearings provide greater load capacity than any other non-ferrous bearing of comparable size. Close tolerances assure minimum play and quick response in the controls.



Type A1 self-aligning Needle Bearings are used in the aftershaft control lever shown the spherical bore shaft and mounting housing that provide ultimate self-aligning ability in 360-degree cyclic test, that exceeded initial service conditions. Needle Bearings still functioned perfectly.



Torrington Needle Bearings lend themselves ideally to the lightweight, compact, high capacity design essential in modern aircraft. Our experts will gladly help you adapt sophisticated Needle Bearings to your requirements. Write us today. The Torrington Company, Torrington, Conn., or South Bend Ill. Tel. District offices and distributors in principal cities of United States and Canada.

## TORRINGTON NEEDLE BEARINGS

Needle • Spherical Roller • Tapered Roller

Straight Roller • Ball • Needle Rollers

The set includes a turn-of-the-crank, power supply unit and synchronous motor, mounted just out of the pilot's view. Two scopes (plus position indicators) and a single control panel are provided for the pilot and copilot. Two experimental purposes, a third scope, a discharge unit of controls, signal power measuring equipment and other provisions for taking data are included in the cabin.

Reconstructions based on experiments with the APS-10 set have resulted in development of an improved installation, currently being tested by the Navy. This set, designated APS-12, is a product of Hughes Corp., Los Angeles. It features higher power, an antenna which is stabilized against roll of the plane and an improved antenna rotation pattern. Other companies besides GE and Hughes engaged in developing better airborne radar are Sperry Corp., Glenside, Pa.; Westinghouse, Inc., New York City; and De Mummy Build, Inc., New York City.

• **Captain Weather Samples**—Another interesting feature in the "Gleaner" was a pressure lock permitting ball children and sea pups to be released outside the plane without loss of cabin pressure.

When land had been reached in the catbird, the device was pulled back into the cabin and the ball almost acted as an exhaust for control communication. As engineers have measured the chances to determine how large they must be to damage airplanes. Involvement such rates anything above 4 in. can be dangerous. After balance tests could be set up to tell whether had penetration ahead of its result about 6 in.

The "Gleaner" also was equipped for research in turbulence using and special test instrumentation, and can be used to test a new color permeability supercharger. This with the equipment were carried out simultaneously with other experiments.

The Cooney-Lewis flying laboratory was used for aerial research work for almost a year. It has been flown over much of the U. S. and Canada, and set out the worst type of weather conditions in simulated carrier operations. The demonstration flight on its last day this capacity was a time it being considered for regular airline service.

## North American Plans Guided Missile Study

Construction of a new research laboratory for solving most specialized problems encountered in guided missile flight has been announced by North American Aviation, Inc., Los Angeles. Costing \$50,000 the lab is being erected within the main building of the company's Downey, Calif., plant. It

will be equipped for investigation of problems involving extreme high altitude, "U" loads and vibration, extremes of heat, cold and humidity, and gyro mechanisms.

An expensive feature will be an "equatorial mount" for gyro development. Attached to a concrete pad in the earth and mounted against vibration in the factory, the mount will be aligned with the axis of the earth by guiding an star through an opening in the factory roof. A super-accurate clock mechanism, built by the company's astronomical laboratory, will rotate the 15-ft. dial just above the north to give a stable platform for watching gyro "drift." North American

engineers presently are working to rotate gyro dial to just over 100 revolution per year.

To simulate the movement of a missile in flight, the new laboratory will have a test chamber with a temperature range of -75 to 150 F. Engineers will be able to encase the chamber to simulate atmospheric pressure encountered by missiles at 100,000 ft.

A centrifuge which can whirl cars points up to 34 ft. to create a load 75 times the force of gravity also will be included in the test set-up.

And the laboratory will be equipped with a horizontal and vertical vibration machine which will vibrate loads up to 100 lb. to test under the force of gravity.

**nearly all major airlines  
use EDISON Fire Detection**

*Edison Systems also approved  
by the U. S. Air Force and U. S. Navy,  
and conform with C.A.B. requirements.*

## note to aircraft engineers

In addition to providing the ultimate care the utmost in safety and dependability, Edison Fire Detection offers definite advantages to the aircraft engineer. In proving prototype installations, for instance, the Edison System acts as its own instrumentation. Since the Edison Detectors are thermocouples, no test test instrumentation need be located in the fire alarm. Readings of thermocouple output under various temperature conditions in the fire test during test flights or ground run-ups can be taken directly.

Edison offers the services of experienced field engineers for supervision of first stage prototype testing, to correct manufacturing, without charge.

**Remember—on Edison Fire Detection System,  
properly installed, cannot false alarm.**

177 LAKESIDE AVENUE, WEST ORANGE, NEW JERSEY



INSTRUMENT DIVISION  
**THOMAS A. EDISON,  
INCORPORATED**





## Bigger Value for Every Job CHEVROLET ADVANCE-DESIGN TRUCKS

**CHEVROLET** It takes a truck operator to really evaluate a truck. Yes, the man behind the wheel is the one who can best appreciate the worth of powerful yet economical performance... extraordinary load capacity... lasting quality, ruggedness and handling ease. He's the one who recognizes the advantages of new, improved features—of greater comfort and convenience for the driver. And these men are the drivers' sons—these experienced truck operators across America—know that Chevrolet trucks deliver more of the value factors they want. They know that Chevrolet trucks cost less to operate, less to maintain, and have the lowest list prices in the entire truck field. That's why they use more Chevrolet trucks than any other make! Your Chevrolet dealer will give you the facts in detail!

CHEVROLET MOTOR DIVISION, Chevrolet Motors Corporation  
DETROIT 2, MICHIGAN

### TOP-VOLUME PRODUCTION BRINGS YOU TOP-VALUE FEATURES!

Chevrolet's new 48000 VINCHERIGHT TRANSMISSION offers superior, solid and even operation. Double clutching is abolished because the gears are always in mesh. Faster shifting means speed and economy in grades. Available in series 3500 and heavier duty models.

Chevrolet's power plant VALVE-IN-HEAD ENGINE gives improved durability and efficiency as well as the widely praised economy for their size.

Chevrolet leads here too. The famous GM "504" "BEEHIVE" 1" Outside Air is drawn in and cooled or heated and filtered in cold weather. Chevrolet Advance Design brings you the FEEBLOWDOWN CAR, national air pollution control model, simple, sturdy and efficient.

Chevrolet's exclusive SPINER REAR AXLE HUB CONNECTION adds greater strength and durability in heavy-duty models.

Standard 48-Speed Coil Construction • Large Overhaul Fully Adjustable Ball • All Round Visibility with Rear-View Mirrors • Rescue Service • Super-Strong Frame • Full-Service Payroll Parts • Air in the 3500 Series and Heavier Duty Models • Double Articulated Bunk • Live Lanes • Hydraulic Power Brakes in Series 3500 and 4800 Models • Available Color Options

Heavy and light-duty options and new color schemes with 40 new equipment standard safety kit

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!

## How Navy Solves Its Jet Problems

Engineering refinements to aircraft and carriers help  
lick difficulties of operating planes from shipboard.

By Robert McLeaves

In the short space of just three years since the Navy's first jet fighters made its initial bluffs from a carrier deck, its fleet of these planes has grown to more than 150 aircraft of a variety of types. And the operating problems have grown apace.

It was clear, in May, 1946, that the basic problem of operating jet fighters from a carrier could be solved by proper design. Early doubts about the jet's inability to take off in the short distance of a carrier deck as take a landing, "solved" was dispelled quickly by experience with the McDonnell F1H and F2H and the North American FJ jet fighters. All have been operated successfully from carrier decks.

► **Conditions Differ**—The Air Force is, of course, operating more than 2000 jet fighters but problems of landing a jet fighter from a 600-ft runway and from a carrier deck often are almost as different considerably. The difference is so great as to demand special design requirements for the aircraft.

The Navy jet must have a lower stalling speed (lower loading and take-off speed) than its Air Force counterpart. This is obtained by using greater wing area and, therefore, lower wing loadings in Navy craft. (Navy jet fighters, to date, exhibit wing loadings in the 55-67 lb. sq. ft. bracket, whereas USAF jet fighters average from 55-75 and higher.)

► **Lower Top Speed**—This lower wing loading, at first glance a penalty paid for carrier deck limitations, actually gives the Navy jet fighter superior performance advantages. First, for example, this lower wing loading provides a superior rate of climb. Second, it produces a higher service ceiling and, third, it produces greater maneuverability at high altitudes.

Thus, in all the important combat characteristics, save rate of speed—the Navy jet fighter has an important advantage over its land-based counterpart.

But lower wing loading means lower top speed, and in this one consideration the Navy fighter may always be expected to be slightly inferior.

► **Pretty Small**—Faster design, however, can minimize this penalty, as well as others inherent in the carrier fighter.

For example, the necessity for a steep landing gear and supporting structure on carrier landing, coupled ahead ship, carrier deck arresting gear hook, catapult fittings, etc., can be accommodated in a fighter design with-

out involving significant penalty. In other words, if such equipment were added to an existing Air Force fighter it might involve a weight increase of 5-10 percent, whereas, by providing these installations in the original design no weight penalty yet it can be said to have been paid.

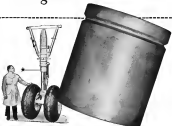
► **Range Can Be Low**—One of the basic

Navy jet fighter has inherent difficulty is its reduced wing loading is a comparatively reduced fuel load. "The Navy jet can afford a lower 'bulk in' range than the Air Force fighter because the great portion of its range is in time in the carrier deck."

Due to no ocean subsidies a lack of Navy interest in aircraft range, most every effort is made to provide the maximum portable in such new designs.

However, the tactical position is rather different in the two types. The Navy fighter can execute an interception 1, 2, 3000 mi. from shore by using

YOU CAN BE SURE... if it's  
**Westinghouse**



**Micarta**

CUTS DEAD WEIGHT UP TO 80%

Because Micarta is really  
**TOUGH!**

Micarta helps aircraft by lightening 10% lighter than aluminum... 40% lighter than brass... Micarta is used for many structural parts. In many cases, it does jobs better, because Micarta also absorbs vibrations, reduces noise, cushions shocks, flexes without fatigue, lasts longer, does more, measures and maintains heat and cold.

Ask your nearby Westinghouse office

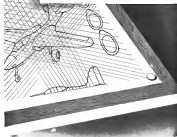
For Micarta Data Book B-1184-C and Micarta Products Book B-1184-D, or write Westinghouse Electric Corporation, P.O. Box 666, Pittsburgh 30, Pennsylvania 15220



## facts to remember about

### TINNERMAN *Speed Nuts*®

when you specify aircraft fasteners



- 1 **SPEED NUTS** cost less . . . weigh less than any other self-locking aircraft fasteners.
- 2 They're easier to install . . . easier to remove.
- 3 Provide greater resistance to vibration loosening.

Thousands of SPEED NUTS, SPEED CLIPS®, and SPEED CLAMPS® are designed specifically for aircraft applications, and provide lower costs, increased production and im-

proved product quality. For more details, please give Tinnerman representative or write to: Tinnerman Products, Inc., 2424 Fulton Road, Cleveland 13, Ohio.

**TINNERMAN**



*Speed Nuts*  
Fastest thing in fastenings



FASTEST THING IN FASTENINGS

the carrier to cover the last 5,000 mi., whereas Air Force fighter interceptors are limited to 3,000 mi. or less.

While remarkable progress has been made in the past few years in aircraft design and propulsion, carrier fighters and equipment for handling this program have not kept pace, for obvious reasons.

The 55,000-ton carrier United States was to have anticipated most of the losses incurred in jet fighter operations over the past few years, but its cancellation has forced the Navy to concentrate attention on bringing its existing carrier up to date to the extent possible with available funds and the characteristics of the individual ship.

The airplane itself must be modified to accommodate some of the problems inherent in its gas turbine powerplant and in its operation from the aircraft carrier deck.

► **Power Induction Problems**—One of the hardest pressed sections of the Navy Bureau of Aeronautics is the fastenerless group. Not only does the gas turbine powerplant demand special provisions, but the greatly increased speed of the jet aircraft has posed new retention problems.

One of the basic problems at the present is the development of a power indicator for jet thrust. Reintegrating engine output have a variety of restrictions for advancing the pilot of operational conditions. For example, the combination of a turbocharger and a power indicator for jet thrust. Reintegrating engine output have a variety of restrictions for advancing the pilot of operational conditions. For example, the combination of a turbocharger and a power indicator for jet thrust.

► **Rocker Approach**—However, the problem of approaching threat at a harbor in flight is complex. Existing jet fighters have inadequate spin and torque for precise approach, both of which give an indication of engine output. However, a relatively small change in engine speed can produce a major change in engine thrust. Also, thrust is affected by the viscosity of temperature, altitude and pressure.

Some threat is easily determined as the power by measuring the aircraft on a stand and using its thrust to operate a scale (Aviation Week, Aug. 22, 1959), but this procedure is of little value to the pilot.

Plans of current jet types use the winged indicator and rate-of-rise factor as the best present indication of thrust. But Baker has developed an instrument which automatically measures thrust from engine pressure and, after several tests, the new device probably will become standard jet fighter equipment.

► **Flare, Turn-on-Bank-Low**—dog and high wing loading of jet fighters have induced their winging, which is that several miles are required for a dual low turn. When required, fighter pilots tighten up these turns by increasing their angle of bank and these steep banks cause current attack guns to trouble. A new type of maneuvering aircraft known as now being installed on all new Naval jet fighters.

Another tactical problem with our jet instrumentation is its operation from the aircraft's electrical system which, upon malfunctioning or interruption by gunfire, leaves the pilot without instruments. Baker has developed a computer to blend from the engine computer to operate the turn-on-bank indicator.

Future jet fighter instrumentation will utilize this computer unit as computer with electrically operated computers and gas pressure, as that in the event of failure of the latter the pilot will still have an indication of the plane's attitude.

► **Angle, Fuel Indication**—An angle of attack indicator also is being installed on all new Naval jets. An important difference between the jet and conventional fighter is the former's greater percentage of gross weight devoted to fuel. This large fuel load and its rapid consumption make a considerable difference in stalling speed between full and empty tanks.

Since carrier landings are made on the basis of approach angle rather than approach speed, the stalling angle at start on level approach must be held the same regardless of approach. Lighter craft will land more slowly, heavier planes faster, but both will maintain the same angle of attack. Hence, an angle of attack indicator on a carrier-based aircraft is a vital instrument.

High fuel consumption is rendering an accurate and compact fuel flow system a seriously difficult Navy fighter planes and the well known standard equipment. Most modern designs now being tested is integral with the fuel nozzle, one in that the more water used, the more fuel is consumed and the amount of fuel consumed. A special modification of this instrument gives a reading in minutes of flight remaining.

► **Radio, Turn-on-Bank-Low**—operation is a fast moving field of activity in Baker. A new radar gun is now being installed in the nose of all new jets. Designed for both interception and navigation, this equipment is superior to current AN-19 units. A new device, designed by Baker as a VHF (very high frequency) equipment to simplify the navigation problem in both jet and prop, and this is now standard for all jet aircraft.

The standard 50-watt carbide gun has proved ineffective against jet craft.



## PIONEER CARGO and AIR-SEA RESCUE 'CHUTES are custom-built to fit every need!

Pioneer cargo chutes are available for any type of cargo that can be dropped from an aircraft. Pioneer maintains a special department for the manufacture of cargo 'chutes, in sizes ranging from 8 feet to 150 feet in diameter. Rely on Pioneer Parachute Company for high standards of workmanship and performance.

**PIONEER PARACHUTE COMPANY, INC.**  
Manchester, Conn.

## Leach relays of tomorrow...

### IN DESIGNS OF TODAY!



LEACH RELAY COMPANY has been in business for over 30 years designing, building and developing thousands of types of relays for thousands of applications. Landing control and military aircraft mechanisms specify Leach RELAYS in standard equipment. These include AN, ANF and ANF types, also included an ANF approved substitutes for AN types. New designs and modifications are in a constant stage of development for specific requirements.

Highest standards of engineering, materials and workmanship assure long, safe, efficient and dependable service.

FOR BETTER CONTACT THROUGH BETTER RELAYS—SPECIFY LEACH

**LEACH RELAY CO.**

215 AVIATION BOULEVARD • LOS ANGELES 3, CALIF.

Representative in Montreal: Chas. D. & Co., Canada

because of greatly increased internal clearance and reduced ring heat. The jet can run no cooler yet has target band up than he must break off to load oil gun. Therefore, 10000 rpm, or more standard equipment on all new jet fighters.

► **Shutles**—Greatly increased starting loads of the gas turbine engine has created a demand for larger and larger starters. While a piston engine starter has an output of 2-4 hp, gets require from 10 to 250 hp per jet for turning them up to required speed for firing.

BuAer has investigated a wide variety

of starting systems but presently is concentrating on development of the Airbreath gas turbine compressor system (Mentzer Works, Inc., 27, 1946), allowing 60 hp for starting, weighing only 15 lb.

Although the present unit is too heavy and bulky for jet fighter installation, refinements for weight reduction are being studied.

► **Carrier Facilities**—Improvements in the carrier and its equipment are being made to accommodate the special problems of jet fighters. The increased fuel capacity and consumption of jet fighters has complicated carrier fuel handling facilities. To cope with this situation,

the basic-class carrier conversion is under a sweeping rate that soon that carrier available.

Diagnostic facilities are being improved, additional fuel capacity is being provided. And many additional pump jet systems are being installed.

All Naval jet fighters are catapulted when loaded to maximum military gross weight and higher capacity catapults are being installed. BuAer has conducted studies of methods for maintaining critical "spinning" in which the fighter is tossed into position over the catapult fittings.

Power outlets for starting are being provided adjacent to the catapult. Some power outlets are being added along the edges of the flight and hangar decks.

The comparatively short tailshaft vertical heat has greatly increased the frequency of engine overhaul. Accordingly, additional engine shrouds are being provided, and additional engine hours installed.

► **Deck Cars**—Until the new engine starting equipment is installed in lighters, auxiliary power from deck cars will be used.

The current system consists of a conventional jetty with eight beltways. It is down about the flight deck, to a divided search during the starting phase of operations. An unserviceable in this close vehicle may cause a delay at a not satisfactory for the light work demanded among closely packed fighters.

A new track is being developed by O. E. Berkey & Associates, Phila. This unit is a three-wheel design with the front pair of wheels fixed and the rear wheel unserviceable via a vertical steering wheel. The unit can turn 90° in its own radius. It mounts a pneumatic drive motor, allowing 74, 60, weight 2500 lb.

► **Chaps**—The problem of oxygen supply is being explored but it is complex and concerns highly specialized equipment. The Navy has tested the latest oxygen equipment built by Eclaire, France, division of Bendix Aviation Corp. and based on a National Bureau of Standards design (Aviation Week June 11, 1949). But the use and weight of this equipment which portable for each engine aircraft makes it impossible for jet fighter use.

However, NBS has developed a unit with a 15 ft. diameter that weighs only 16 lb., compared to 22-4 lb. for the standard pilot's oxygen cylinder.

Problems of protection that exist from gunfire is important. The current unit is one tank with welded shrapnel and one, though not a direct hit by a 50-cal. bullet leaves the liquid oxygen tank will not burn. Some pilot may be utilized around that unit and its weight may become a factor.

## New Metal-Forming Process Developed

A new process, called *Shap-on*, which promises to reduce greatly the cost of producing formed sheet-metal parts, has been developed by the Naval Ordnance Division of the Naval Air Materiel Co., Baltimore, Md.

The method is claimed to permit faster production of many formed parts than at the same time, cut down the need for expensive tooling and dies. According to Matin president, C. C. Pearson, the new process may save hundreds of thousands of dollars annually for the aircraft industry.

Principal feature of the method is the precise control of the pressure exerted for the forming cycle of the part. The pressure forces to be formed size of wrinkles and reduces spring-back to a minimum. It enables the operator to make complex parts, involving drawing, shearing and stretching, at the rate of 50-100 per hr., yet hold tolerances to  $\pm .002$ .

Stainless steel exhaust stacks, for example, reportedly can be produced by means faster than with conventional methods—50 units per hr. compared to a deep-draw rate of 3-5 units per hr.—with economies in material thickness, nearly exceeding 5 percent.

The process can be utilized to form and form flanged parts such as exhaust case ribs. The finished part is said to be entirely free of wrinkles and to have negligible spring-back. No flange is needed to draw the parts inward, because it is drawn into itself to give a smooth outside shape.

According to the company, preliminary tests indicate the process can be used to:

- Form sheet-metal to compound curves with deep-draw flanges, without wrinkling.
- Make deeper draws in steel until then is possible with conventional tooling.
- Eliminate finishing of parts by hand or in a separate operation on those parts formed in rubber or hydro presses and on some die-formed parts.
- Sheet, as well as form parts, in the same operation.
- Form several different parts having complicated contours, but provide precise curves, at the same time.

Other advantages claimed for the method are that it will maintain part body uniform wall thickness from the blank to finished part, will not affect surface finish of the metal and coatings, and will leave parts in relatively free of internal stress concentrations. It is said the Matin process also can be easily adapted to hot forming procedures.

## when you're glad you have a Snap-on



tensioning cylinder head nuts with a Snap-on TORQOMETER

Efficiently get work . . . hit the specified pressure right in the correct inch or foot power! You can do it every time with a Snap-on Torqometer because you can see the applied torque as the bolt is tightened. As a result, any faulty condition that might be caused by inaccurate or unaccepted bolt tightening is eliminated.

Snap-on Torquometers are available in sizes ranging from one-10 to 10 to 200,000 ft. lbs. Snap-on Torquometers and all other Snap-on tools are available through a nationwide, direct-to-user mail service. Look for the "Snap-on Mail" . . . he calls regularly.

**SNAP-ON TOOLS CORPORATION**

3030-J 24th Avenue  
Kenosha, Wisconsin  
Incorporated in Kenosha Wis., U.S.A.



where precision counts . . .

# BH



**B-36 HUB DUCT  
HEATED AIR DE-ICING  
CURTISS WRIGHT  
PROPELLER ASSEMBLY**

- Gas Turbine Compressor
- Turbo Prop
- Propeller Gears
- Cowl
- Collector Rings
- Engine Mounts
- Airframe
- Tanks
- Sheet Metal Fabrication
- Sheet Metal Stampings



Let us know your requirements  
SUPPLIES TO MANUFACTURERS ONLY



**B. H. JENSEN COMPANY, Inc.**  
1000 Pennsylvania Avenue, Northeast  
WASHINGTON 2, D. C. 20002

## NEW AVIATION PRODUCTS



### Blower for Aircraft

For cockpit cooling and heat drains, this lightweight, small flow blower, of tried by Rhodes Lewis Co., 4628 Wilshire Blvd., Los Angeles 16, Calif., are guaranteed to produce consistent air flow output for size of unit.

Made of aluminum alloy with axial action blades, blowers are designed for operation with a.c. or d.c. motor. On supply of 3 in. model (shown) is 30 cfm at 100 rpm with no static head. Weight is 1 lb. 9 oz. complete with motor, this unit is provided with angle locking leads and double sealed for universal mounting.

Larger, 5 in. blower has 250 cfm output with static pressure of 2 in. of water at outlet. Device weighs 2.5 lb. with 450c, a.c. motor.



### Small VHF Radio

Intermediate type VHF receiver and transmitter developed by Kew, Inc., 110 Lane Ave., Citrus Heights, Mo., is completely developed and specially adaptable for installation on panels where space is limited.

Working only 4 ft. 4 in., model LR-100 receiver has continuous tuning for all VHF waves, radio range and VOR reception facilities. With device size of 1 1/2 x 6 1/2 x 7 1/2 in., unit takes no more mounting area than two standard aircraft instruments.

Model KT-100 transmitter of 2 watt, 4 frequency unit weighing only 1 1/2 lb.

Measuring 3 1/2 x 5 1/2 x 7 in., it fits into single, average size instrument mounting hole.



### Paint Spray Booth

Ready-to-use paint spray booth, providing suction of paint fumes as at both top and bottom of water curtain is at trial by Newmark-DeWitt Co., 5745 Russell, Detroit 11, Mich.

This pre-manufactured machine is recommended to effect clean, brilliant spray conditions by creating more even flow of air across face of booth, thus giving maximum amount of paint efficiency, and by pre-washing air before it enters the regular filtering section of the booth.

Enter working action is created by suction flow exhaust fan. Air entering through top is pre-washed as it passes down curtain of water curtain, while air passing under curtain is washed as it passes through water cascading from curtain into tank. Both streams of air and water go to bottom of curtain and are carried on revolving tower where air stream direction is reversed twice as it sweeps against water blades. Air then moves upward through water curtain, exiting at front wall. Recirculating through of water are renewed as air passes through automatic aspirator before entering exhaust fan. Paint-laden water settles in tank at floor.



### Small DC Motor

A 1 lb. 1/2 in. dc motor stand to be useful for any application requiring linear or rotary motion, such as opening of wing doors, pumps, lifts, and fuel oil or air valves is offered by Electric Air, Inc., 11440 Sunset Blvd., North Hollywood, Calif. Range torque is listed at 1 to 10 in. at 30,000 rpm at 2 1/2 in. line motor is said to be adaptable to many other torque and speed requirements and to specific plans and drawings. Having a compact design and tank built, weight of device is given as 15 oz. (not including wiring gear) is 2.57 in. x 1.75 in. d. Mounting plate is 2.7 x 3 1/4 in.



### Industrial Wheels

More, Inc., of stainless steel and brass industrial wheels in 6, 8, and 12 in. sizes is announced by The Rex Wheel Co., Bridgeport, Conn. Units are tapered type roller bearings, and are recommended for use in highly resistant, heavy duty subject to compound load.

According to company, wheels are 90 percent lighter, put in string and run less than wheels sold on steel core. Special steel and brass core models are available.

## PRODUCTION



HILLER 360 LINE, assembling three "open world," now recently shown to shareholders.

### Hiller 360 Output Nears 100 Mark

Five basic models of two-place rotary wing craft are in production. Company has obtained \$1.5 million credit.

More than 4000 United Helicopters, Inc., stockholders attending the annual Palo Alto, Calif., factory open house heard President Stanley Hiller, Jr., announce a new order for five "open world" and describe the firm as "the world's largest manufacturer of conventional rotary wing aircraft."

Hiller said that production is now up to three planes per week. The latest unit built is now being produced in five different configurations, and stockholders were treated to demonstrations of crop dusting, spraying, power line inspection, rescue operations and aerial flying.

Sales specialists-Twelve full-time representatives are selling the 360, Hiller said, and such concentration spot heavily as a focus of sales associated with the predominant safety in its use. As examples, he cited Rotary Wings, Inc., of Sacramento, Northern California distributor which specializes in the agricultural market, and Pacific Helicopters Co., Southern California distributor, which has been developing personal transportation and other markets associated with that part of the country.

Loose Permit Quantity Buying-Missoula, United Helicopters has obtained a \$500,000 line of credit from a combination of financial sources, including the Reconstruction Finance Corp., the Bank of America, and "private sources." The credit will be used to reduce the cost of purchased parts and subassemblies by allowing placement of larger orders with manufacturers. With production of number 100 Hiller 360 in sight, the company has already started placing orders for the second 100 craft.

### Canadair Ready to F-86 Production

While Canadair, Ltd., is preparing to produce the F-86 jet fighter, the possibility is also that the Canada jet fighter, designed and built in Canada by A. V. Roe, will be built in a North American built F-86 to determine its suitability for use in Canada's military.

The Canadian defense department recently signed a \$10 million contract with Canadair to build 100 F-86s for the Royal Canadian Air Force.

Actual contract price-\$18,211,100-being down the way. Airframe, \$10,029,000; engine, spare parts, \$1,582,993; production and auxiliary tools, \$2,179,000; royalties, \$4,020,000; public relations and ground handling equipment, \$475,100. Engines, radio, instrument and other special equipment will be provided from other sources.

The Montreal company, wholly owned subsidiary of the Electric Bond Co., probably will begin delivery in August, 1954. The F-86 is no longer standard fighter equipment for the RCAR, replacing the British-built de Havilland Vampire.

As a direct result of this new contract, Canadair will receive a \$2 million advance to build 100 F-86s at Carletonville, Montreal, providing over 200,000 sq. ft. of additional covered space. Of steel construction, the new building is to be 115 ft. by about 700 ft., and will be used for fabrication of aircraft parts and fabrication and assembly of tools, dies, jigs and fixtures. F-86 assembly will be done at Plant 2, also at Carletonville.

## PRODUCTION BRIEFING

►Gannett Aircraft Engineering Corp. has placed a \$1.5 million subcontract with Trans-Consolidated Co.'s Bedford division, giving the 57 million total subcontract from Gannett to the company. Original contract was for engine parts, water pumps and control surface for Gannett. Latest contract is for engine parts.

►Bath Co., Inc., has made the A-76 to the Danish Air Force for use as trainers. Aircraft will be evaluated by Scandinavian Aero Industri, which then will be able to go into production for that market for the year.

►TEMCO (Tevco Engineering & Manufacturing Co.) has received three new contracts from Consolidated Vultures from the Boeing Co. for the design, development and fabrication of new and other production tools for the B-36. Company has placed four new plants into full scale operation, equipped for testing and control of propellers, rotor and engine equipment, instrument and hydraulic assemblies for military and transport aircraft.

►Curtis-Wright Corp. is offering a test and technical assistance plan to potential operators of C-46 aircraft by making field representatives available to aircraft operators who want the second military aircraft. C.W. will also furnish representative publications and handbooks on all engineering changes and modifications at no cost.

►Gloss L. Morris Co. has been ordered to have the first annual report of the (annual) report by an independent board of judges for Financial World's Annual Report Survey United Aircraft Corp. and Douglas Aircraft Co. were recommended in the industry.

►Buckley Aero Controls, Inc., Canton, Mass., has announced a new metal cutting process which cuts, grinds, drills and cuts a product to its finished state, eliminating 60-70 percent of machine operations. The Buckle-Buck process, pending patent, says the process is applicable to forming of all metals, in shaping aluminum, steel, brass, bronze and copper.











## BRIEFING FOR DEALERS & DISTRIBUTORS

**NEW FOURPLACER**—The long misted four-place which C. G. Taylor has been developing for the last three years has been finally test flying over at Cawson-Pittsburgh Airport and is completing an AYC test. Taylorcraft, Inc., showed the four-place, the Tourist, to a few people in a hangar out at Cleveland at the time of the National Air Race but doesn't plan to make a full national announcement on it for several weeks until quantity production and delivery schedules are set.

Messerschmitt-Taylorcraft has announced a 1954 line of four-planes including a \$1895 Special Deluxe of 65 hp., and two 85 hp. planes, the Canton Deluxe, \$2585, and the Sportplane, \$2490. Plans feature improved visibility, new doors, new benches, more luggage room. Sportmen has a special hand-sanded paint job, studio studio, generator, stall mounting indicator and navigation lights in standard equipment.

**824th AIRPLANES**—Recent statistical study of U. S. civil aircraft released by CAA shows that, as of July 1, there were 92,656 civil aircraft. Of these, 36,212 were single-engine planes, 4521 were twin engine, 132 four-engine, 39 tri-engine, and one eight-engine plane (Hughes Hercules). New figures represent a careful sorting out by CAA of "deadwood" from private buyers, which carried planes after they had been retired from service for months or years. Total figure is smaller than the 97,619 reported as of Aug. 1, 1948, but CAA statisticians think most of the difference is an "dead" registration of last year. Current manufacturing rate however, especially on general planes, has dropped to a point where it is doubtful if enough new planes are being produced in 1949 to replace those retired for various reasons.

**CALIFORNIA STILL ON TOP**—As was the case a year ago, California leads the nation in number of planes with 18,412, only a slight margin from last year's 18,639. No. 2 state, Texas, showed a drop of more than 1000 planes, from 8448 to 7027. Other states in the list: 10. Illinois, 4751; New York, 4460; Michigan, 4235; Ohio, 4100; Pennsylvania, 4140; Korea, 2914; Indiana, 2710; Florida, 2578. These ten states together contained 47,452 planes or more than half the total in the country.

**KAMAN DUSTER**—Part of the Kaman two-seat ducted model jet-engine to appear in the South, has been delivered to Copel Distributing Co., Canada. N. C., sales agent for the Kaman Aircraft Corp. in North and South Carolina, Georgia and Florida. Upon completion of its test series during summer the helicopter will be taken to Florida for winter "trial applications" such as vegetable and citrus crops.

**ROCKELOWEY CARNEY**—Rui Carney, field sales representative for Van Doren Aircraft Supplies, has mounted an extensive tour, here on the landing gear of his Cessna as a means of demonstrating the Safe Flight partial winging system. "The horn is in addition to the regular 'wingtip' in the cockpit which snaps off whenever the pilot gets dangerously near a stalling attitude. But Carney's big hope can be based on the ground from 1000 ft. altitude, when he demonstrates various types of stalls.

**WANTS PROOF**—Sometimes it takes the aviation industry quite a long time to warm up to a new idea, in the action of the CAA's new Airport Access Committee demonstrated recently. The committee unanimously disapproved construction of multiple-direction runways at airports "until there is proof of the practical value of devices such as the railroad landing gear which would tend to eliminate the accuracy of more than single runways." Meanwhile CAA technical men have already confirmed the need and got in plans to be in the Douglas DC-3. Just how much more proof is required in an interesting subject to ponder. But to be on the safe side, the committee requested the members of the various landing gear and stated that single-strip runways have a place in aviation and should receive federal aid."

—ALEXANDER McSIBURY

airmobile business is the striking example of the fact that the survival of the fittest is the best strategy of a stress analysis."

**Looking forward:**

• **Expanding good personal plans** such as the Boccara, Cessna, Stratus Piper and Navion will continue to expand and be extended in practical business and farm uses.

• **What the private owner really wants** the airplane which will fly from area to 250 mph. This may be achieved either through a conventional with rotor for vertical lift and descent and fixed wing for high speed cruise—wing, or the slow-flying plane which acts as a shuttle or flow into its wings to come left without transition.

## Tours Europe in Rented Piper

Frank S. Jones, Piper Aircraft Corporation representative, has recently completed a ten week tour of Europe during which he made a number of trips using a 115 hp. four-place Piper Clipper. Largest was a 10-day tour of 2100 mi. through France, Italy and Switzerland, starting from Paris, making stops at Geneva, Milan, Athens, Geneva, Rome and Sicily, and returning to Paris. The plane was owned by Cessna of Pitts, one of a number of firms which has planes available for charter for business travel in Europe.

Jones made another flight in a Piper to Frankfurt, Germany, where he is reported almost to personal planes was very high among American military personnel.

The Piper export representative said that gasoline appeared to be readily available, and that there were no tax barriers or restrictions on business flying except in Germany.

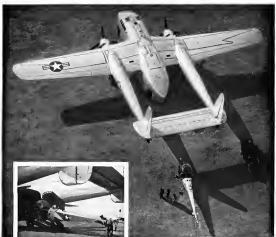
Jones believes that American business men who find extensive travel in Europe necessary can save time and inconvenience by using available charter personal aircraft and that the tax and high in time and greater cost involved will compensate in many cases for any extra expense involved.

## Trade Group Elects

Clay Swaine of Salisbury Aircraft Service was elected president of the North Carolina Aviation Trade Association at the annual meeting, meeting at Asheville, N. C. He succeeded R. S. (Bob) Northampton, vice president of Piedmont Airlines, Inc., Winston-Salem, who advanced to chairman of the board of directors. William H. Davis, president of Air Progress, Inc., Wilmington, was named vice president, and D. J. Holloman, Jacksonville Airport, Inc., was elected secretary-treasurer.

# AIR RESCUE

Over faraway jungles, deserts and mountains, helicopters of the USAF Air Rescue Service have flown in search of stranded airmen and passengers. The helicopters got there because they have been given a "mother" ship—the Fairchild Pocket—then transport them over distances far beyond their range. Then, set Air Force has added a new ability to the versatile Fairchild Pocket—increasing the importance of its part in the development of modern airborne military tactics.



Maneuver of Hopy—Air Rescue personnel load a helicopter into the spacious cargo hold of a Fairchild Pocket.

**FAIRCHILD**

AIRCRAFT AND AIRPLANE CORPORATION  
HAGERSTOWN, MD.

Florida Representative: South Florida, Fort Lauderdale, FL

1. Pilot, Fort Lauderdale, FL

Florida Representative: South Florida, Fort Lauderdale, FL

Atlanta Representative: Atlanta, GA

Continued on page 49, December 15, 1948

# AIR TRANSPORT



CONSTRUCTION workers have given for Oakland via Transcon

## Contract Flight Ban Weighed

Examiners in Transcon and Seaboard & Western cases offer basis for new restrictions on foreign operations.

By Charles Adams

Major U.S. contract airline operating overseas are being hit for air route status project which may prove even tighter than the one devised by the Civil Aeronautics Board for domestic routes.

Recent CAB enforcement reports in enforcement cases against Transcon Air Lines and Seaboard & Western Air Lines cast indications of the reasons why federal enforcement restrictions will be applied to contract carriers. In both operations (Transcon Wren, Oct. 2), the examiners said the companies' foreign operations had violated the Civil Aeronautics Act and associated regulations that the lines be ordered to cease and desist from further flight activity.

"Notified CAA," Criticism U.S. flight has been being increasingly discussed over the activities of contract carriers. The current enforcement case against Seaboard & Western stems from a "TWA" complaint against the unauthorized company.

During the recent meeting of the International Air Transport Association, The Hague, Director General Sir Wilfrid Hildart informed out at the final statement of intent who the problem that is important to the route, routes and other when the traffic is checked.

CAB began tracking down an un-

authorized international operator in 1947, when it prohibited them from transporting passengers on common carrier flights between the U.S. and foreign points. In addition, the stringent regulations governing frequency and regularity of service which affect domestic carriers' passengers and flight operations apply with equal force to foreign flights abroad.

Both Transcon and Seaboard & Western lack letters of agreement or large regular (scheduled) common CAB enforcement attorneys claim that the lines be ordered to cease and desist from further flight activity. In the case of Seaboard & Western, the examiners' recommendation that the companies must be ordered to cease and desist from further flight activity represents a somewhat more lenient recommendation.

Transcon President Chris M. Nelson claims his passenger-carrying flights abroad and most of T.A.I.'s other activities have been under contract. CAB enforcement attorneys and examiners say many of the operations were actually common carrier in nature even though a contract may have been signed.

Examiner's Recommendation: In the case of CAB to order Transcon to cease and desist from further violations of the Civil Aeronautics Act, Examiner Wren at E. Baker also recommended that

the company be forbidden to engage in private (charter) service for hire while violating authority to operate as a scheduled common carrier—except under those conditions.

• All alleged private carriage for hire will be performed pursuant to written contracts which provide for a series of flights over a stated period of time, with mutual obligations as both parties, and their definitions of the categories and avoidance of the cargo or charter of the parties to be named.

• No restriction for private carriage may be executed for transportation of persons or cargo between points where common carriage is provided within the type of persons or cargo which is the subject of the alleged private carriage is excluded from the tariff filed for (passenger) transportation between the points.

• No persons or cargo received by a contract for private carriage may be carried in an aircraft at the same time as cargo or passengers transported in common carriage.

• All contracts for private carriage must be filed with CAB within 30 days after the date of execution.

• Violations Differ—Quoting previous court opinions, Baker and the most striking characteristic of private (contract) carriage is the extremely narrow range of operations in which it may legally engage. In some cases, private carriage was permitted only after it was shown that the company held a limited number of contracts of continuing nature and that there was an absence of solicitation or acceptance of new customers.

CAB enforcement attorneys want the company to be ordered to cease and desist from all its transportation. T.A.I. contends it is possible to be both a



Owen M. Nelson, TAI president

contract carrier and a contract carrier. Specifically, Baker found that Transcon's transportation of passengers between the U.S. and Germany under contracts with construction companies, and of students between the U.S. and Europe under contracts with Youth Agency was common carriage and illegal. The examiner also found that U.S.-Europe passenger and cargo flights for the Army and Air Force may have been legitimate contract activity by themselves, but taken together with Transcon's private operations must be considered illegal.

Ask Legislation-TAI President Nelson told Aviation Week that "if the views of CAB attorneys proved there will be no such thing as a contract carrier by law." He added: Congress should enact legislation giving contract carriers a legitimate place in air transportation.

Nelson argues that it is economically unwise for a scheduled airline to maintain a fleet of planes and a staff of trained personnel to be shifted around the world solely for the handling of one-way contracts for long for the company's regular flight schedule. "If most scheduled airlines is permitted to do so, all other scheduled airlines are entitled to the same practice, and the taxpayer will foot the bill."

The TAI president says only contract operations with extremely flexible services are equipped to take over of emergency events movements.

TAI Operations—Organized directly after the war, Transcon now has over 2000 employees and an annual payroll exceeding \$6 million. Its fleet consists of 13 DC-4s (six owned and six on long-term lease) plus six C-46s leased from the Air Force.

Domestic bases are at Wichita, Kansas, and Oakland, Calif. Other facilities are at Honolulu, White Plains, Tokyo, Osaka, Chicago, San Francisco, Miami, Boston and Knoxville.

Operations-TAI made more than 10 round-the-world flights since 1945. It operated over 30 trans-Atlantic trips with Air Force personnel and supplies during the Berlin blockade. In other wars movements it has flown 20,000 warships to U.S. Pacific island bases, 7000 British warships to Canada over 3000 embossed aircraft to the U.S. and about 30,000 DPs from Europe to South America.

In a three-year period last December TAI flew nearly 1300 war boats from Alaska to New York but lost an insurance law dollar.

During the past summer it transported 2000 students to Europe at a \$800 one-way fare—less than half the regular airline rate. The company has been used by 1000 members between Seattle and Alaska in a week work. It made one evacuation of European

from China during the Communist advance and as a peace negotiator to the United Nations' International Refugee Organization.

TAI would like to do as in the heavy Italy-Turk traffic to Rome in 1950. It claims that with full round-trip DC-4 loads it could make a profit on the U.S.-Italy flights by charging less than \$100 each way. Regular airfare fare is \$450.

Transcon's foreign-point-to-foreign-point operations are beyond CAB's common jurisdiction. In this field, besides the regular flights, the company has several scheduled common carrier routes between Geneva, Switzerland, and Zurich, Basel, and between Rome and London.

Revenues—For the first year ending May 31, 1949, TAI's gross revenue from transportation alone was \$7,415,000. This is more than the reported domestic revenues of National Airlines, Northeast Airlines, Colonial, Continental or Mat Contract during 1948. Transcon showed a \$450,000 profit in third 1948, earned \$115,000 in third 1948 and lost \$100,000 in third 1949. The company's net worth is around \$2,250,000 and its stock has a

book value of approximately \$25 a share. • Operator's Subsidies—Nelson's company also exhibited Philippine Airline operations under a contract to the U.S. and recently signed a contract with Pakistan to perform a similar route for that country. TAI operates the Los Angeles-Alexandria-Suez route in Arabia, Calif., for the military and CAA, has a large overhaul business in its wholly-owned subsidiary, Aircraft Engineering and Maintenance Co., and runs the Tulsa Academy of Aeronautics at Oklahoma Airport.

A subsidiary company, Transcon Engineering Corp., is seeking airport and road construction contracts all over the world. The unit bought up all the construction equipment in the region on White Island (Ireland, Ireland, New Haven, Alaska, steel contracts, etc.) for around \$550,000.

President Nelson has been in over 20 years. A graduate of Randolph and Kelly Fields, he holds an M.A. degree from the University of Washington, served five years in the Air Corps, was a United Air Lines pilot for 13 years and has flown over 15,000 hours. For four years he was first vice president of the Air Line Pilots Assn.

## CMA Loses Valuable Route Permit

Possible revision of Mexican flight regulations seem as result of investigation into fatal crash against volcano.

(McGraw-Hill World News)

MEXICO CITY—The Mexican government has certified Compañia Mexicana de Aviación's permit to operate the new, 1000-mile, probable route between Mexico City and the Guatemala border at Tapachula.

The certification came as a result of an investigation into the crash of a CMA DC-4, only however, new crew and Popocatepetl volcano near Mexico City Sept. 26. CMA, an affiliate of Pan American Airways, flew 26 DC-4s and DC-4s over four domestic routes.

Weather Bad—The plane which crashed killed 35 passengers and crew members, had been flying with "ground contact" although weather was not reported bad and conditions good. It struck the volcano at the 15,000 ft. level, at a point some 300 ft. below its top.

Investigation so far has shown that the plane was equipped with the latest types of navigational aids, but was badly hit by the eruption of Popocatepetl in 1946 possibly be shaken the route. Flying by instruments was not a factor in the crash, says Gen. Cruz, commander-in-chief of the VFA, but also took it out of operation between Seattle and Alaska in a week work. It made one evacuation of European

into fatal crash two years ago. • Certification—The government, through the Department of Communications, which controls air transport in Mexico, denied the following reasons in cancelling the permit for CMA to fly this route, finally after a month in (over in Southern Mexico). • The pilot was responsible for the accident because he failed to maintain the correct altitude during the climb over the volcano.

The pilot, arrested at using the route between the volcanoes, should have gone around by the alternative Capatzen-Tapachula route.

• The company, CMA, was responsible for not having cancelled the flight, since weather conditions were such as to make such certification mandatory.

Senator Kibler—The action against CMA by the government is left to be at least partly due to the death aboard the plane of National Security General Manuel Nolasco, a personal friend of President Aleman and an important official of the VFA. A lawsuit suit is being conducted by the Mexican Senate.

Further outgrowth of the investigation is a demand by several leading Mexicans that the flight regulations be

Mexico must be completely overhauled. One of the primary goals is that "ground contact" flying be permitted in order to shorten the route. A second point is that although the plane had tested very navigational tests, the proper rules haven't been made. The objective was not operating in Mexico.

The route undoubtedly would be patterned on U. S. regulations.

► **CMA History**—CMA, which lost its permit on the southern leg, has three other important domestic routes—two to the north and one to the Yucatan peninsula.

The company was organized in 1927 at Mexico's first commercial line and was purchased by Pan American in 1929. Its routes were trained by Pan American and its flight services coordinated with PAA lines. In 1946, PAA sold out its controlling share of the stock in CMA to Mexican officials. Several government officials were reported to have received some of the stock. Pan American retained 46 percent.

► **Good Record**—The carrier has been one of two really profitable lines in Mexico and by far the biggest money maker. It had a good safety record until this crash and not long ago recorded a safety award.

Concededly, the permit will undoubtedly constitute a setback on the way to survival. The only companies that might be able to start flying the route at once include Loma, United Air Lines, Atlantic in Mexico and probably one of the smaller Mexican owned lines. It is a profitable run, and the planes on it are generally fitted.

## Court Will Review Piedmont Decision

The Supreme Court has agreed to review a case which may have an important bearing on how far the Civil Aeronautics Board will go in the future in awarding routes to a company that did not apply for them specifically.

At issue is CAB's Southeastern States Air decision of April, 1947, in which the board gave Piedmont Airlines, Inc., the Winston-Salem, N. C., toiler route in Ohio, Kentucky, West Virginia, Virginia, and North Carolina. State Airlines, Charlotte, N. C., has been suing a continuous legal fight to have the decision annulled.

► **CAB Reversed**—Last spring (Aviation Week, Apr. 21), the U. S. Supreme Court Appeals for the District of Columbia reversed CAB's order awarding the route to Piedmont. The lower court said that of 89 points Piedmont applied to submit, only nine were in the links between the routes given to CAB.

According to the Court of Appeals, the routes granted Piedmont by CAB

could not even be considered a selfish exercise of that carrier's private system except by "distortion of reality and totally unreasonable, erroneous and arbitrary interpretation of the word 'modification'." State Airlines had applied for routes similar to those awarded (Continued)

Pending Supreme Court review of the Court of Appeals' decision, Piedmont will continue to operate its 1980 air shuttle hard in the South. The carrier scheduled the routes in February, 1948, under a three-year franchise.

## Australia Has Lowest Air Travel Fares

(McGraw-Hill World News)

MELBOURNE—Declination of the Australian pound in terms of the U. S. dollar has lowered Australian air fares to the lowest basement in international air travel. The Sydney Melbourne fare has been lowered to 12 shillings and 6 pence, or 12 shillings and 6 pence, at a double and therefore a one-1/2 shillings at the new rate of exchange.

Though passenger lines were raised some time ago by 25 percent on most of the steep in exchange value of Australian currency has kept out this increase.

► **Dollar Trouble**—Because of the dollar component in expenditure costs, Australian airlines are unable to start from these low rates. The cost of replacing average American aircraft and of providing spare parts has shot up by 44 percent as a result of the exchange imbalance. Also, practically all American airlines and a portion of the Australian airlines use an American one of dollar as origin.

Writing down of American-built aircraft at present-day replacement cost, if possible, would have deeply cut the book profits of Australian airlines operation. But being compelled to new equipment on the books at original cost, the lines will not be able to show the effect of adjusted depreciation on their balance sheets until actual replacements occur.

► **Replacement Costs**—Most of Australia's civil air fleet was purchased cheaply immediately after the war from government liquidation assets and has been written off. The impact of present-day replacement expense will there fore be at the more drastic where it enters the overall cost picture.

As to airlines, the U. S. Civil Aeronautics Board has been asked to consider the introduction of "faucet-circuit" economic services. Conversion of DC-3s to carry 25 instead of 21 passengers, installation of the new 100-hp engines, low fuel burners, and slugging of loads on short flights and of free low transportation to and from airports are

major features of the projected economy service.

## SAE Forecast of Tomorrow's Airlines

Members of the Society of Automotive Engineers have given their crystal ball a rub to visualize the probable characteristics of the 1955 model airline transport.

Holding a panel discussion at SAE's national aeronautics meeting in Los Angeles recently, the engineers drew this picture of the latest thing in commercial aircraft ten years from now:

- **Power** will be furnished by four turbo-prop (or perhaps turbojet) engines.
- **Capacity** will be 100 passengers internationally and 50 locally, with flights ranging from 120 to 1200 miles.
- **Speed** will be 500 mph—possibly at 350 mph—400 mph at altitudes of around 15,000 ft.
- **Altitude** with runways up to 9000 ft., landing will be required in the largest-range operations.

Charles Wood Douglas Aircraft Corporation design engineer estimated that a prototype of the 1955 SAE transport would cost a minimum of \$12.5 million but said it might be possible to sell subsequent production jobs for about \$2 million if orders for 500 were obtained. Orders for 100 of the domestic version could bring the unit price down to \$1,335,000, 70 said under.

► **Engine Development**—D. I. Jordan Durr & Whitaker jet engine engineers, declared present turbojet engines for transport may not be introduced by 1955. But the turbo-prop engine being well advanced for that time and the turbo-jet perhaps coming into its own. He added that a major share of present expenditures for jet engine plant development is going to the jet engine with the turbo-prop engine receiving a model engine of lower and the turbo-prop engine almost none.

F. H. Allen, manager of A. V. Roe Canada, Ltd. (holders of the DC-3 license) expressed belief that present manufacturing engine transports may be superseded in various aircraft by 1955 since by that time jet engines will be sufficient to replace the current engine. He added that a substantial economic margin over current types will be there and is not to be over-estimated that a replacement engine is likely to emerge which a transport could use to its full in the design for a 1955 model civil transport.

Such a conversion course, Allen suggested, probably would be suitable for all aircraft, including the DC-3. He added that the DC-3 is a simple design, but the only type of civil aircraft to see that is the straight jet transport.



SUPER DC-3 with Donald Douglas and Donald Douglas, Jr., steps at Phoenix where Pioneer Air Lines inspects the plane. Then to...



ATLANTA (left) Delta Air Lines President C. E. Woolson (right) Nat. Washington and...



FIRST SALE to Capital's J. H. Greenblatt

## Super DC-3 Goes on Selling Tour

Capital hopes to have 20 of the craft by 1952; Eastern with 52 DC-3s, is reported considering purchases.

With its first orders on the books, Douglas Aircraft Co. plans to keep its Super DC-1 selling campaign as high gear for the remainder of 1949.

A order ship of the prototype Super DC-3, which has made a 10,000-mile demonstration run, is expected to go on an exhibition tour shortly.

This second Super DC-3 will have 34-37 seats instead of the executive type interior arrangement of the prototype. It will have 160-hp Pratt & Whitney R-2800 engines rather than the 1475-hp Wright R-3400 C58H engines on the prototype.

Douglas plans to complete Super DC-3 confirmation trials by November. Capital Bank's New York office (see page 1) is Capital Airlines (American Wings, Sept. 19) looks like so in the Super DC-3s because the so in the Super DC-3s because the so in the

end of 1952, when its 24 standard DC-3s must be retired into scheduled service under existing mail air regulations. Capital hopes to have 20 Super DC-3s by then.

Other domestic airlines which have not yet acquired postwar two-engine aircraft are United Air Lines and TWA with 69 DC-3s each, Eastern with 51, Delta and Mid Continent with 20 each, Pacific Northwest and Chicago & Southern with 13. Including feeder lines, the domestic carrier will have over 400 conventional DC-3s in service.

► **Foreign Markets**—With an eye to foreign markets Douglas studied Canada and Mexico as the strongest for its first Super DC-3 tour. Dollar shortages and currency devaluations complicate foreign sale prospects, but an answer to the problem is being sought.

Learning of Douglas service centers abroad to make the Super DC-3 conversion in Europe and South America has been under consideration. With this arrangement, complete lists of parts would be sent abroad.

Financial circles have reported that Douglas might enter into a working agreement with Canadian Car & Foundry Co., Ltd., Montreal, for manufacture of the Super DC-3 in the Dominion.

► **Performance**—Latest Douglas data on the Super DC-3 shows the craft will cruise at 250 mph (35 mph faster than the standard DC-3) at 15,420 ft. with the 1475-hp. Wright engines and at slightly lower speed with the 1450-hp. Pratt & Whitney engines. Top speed is listed at 278 mph, using higher power engine.

The new plane's maximum gross take-off weight of 51,000 lb. is 3500 lb. greater than the conventional DC-3. Capacity instead of over 2000 lb. is more than 2000 lb. over the standard DC-3.

With its high-powered engines, redesigned wing panel, lengthened



## Electrical disconnect panels by BURNDY

Pressurized  
bulkhead panels



Burndy pressurized bulkhead panels feature positive locking of individual connectors to the connector sockets, easy circuit identification. Free for connection to panel are made for the popular conductor sizes. Several sizes of panels are available. Approved by USAF.

Expendable panels  
for fuel tanks  
and missiles



Burndy UMBILICAL DISCONNECTS for guided missiles, and DISCONNECTS for disposable fuel tanks, can be designed to specifications. Standard types are supplied to accommodate a variety of conductors for many refrigerant and cryogenic. These disconnect consist of two parts, a retainer panel and an expendable portion which can be jettisoned by an electrical or mechanical release mechanism.



New fast-action universal bulkhead connector. Crablok provides quick connection, plug-in terminals, and built-in safety features. Approved by USAF and Navy for use on Guided Missile and Rocket Motors.

With the information on Burndy Plans and Burndy Connectors and other Burndy Connectors, complete information is offered.

Connect with  
**BURNDY**  
New York 44, N. Y.

WETTER BEACH, Yuma 11, CALIF.  
CANADIAN BURNDY CANADA LTD., Toronto 8

damage and larger tail, the Super DC-3 is more than 60 percent a new plane, according to Donald Douglas. But he has stressed efforts to ease the drop in any of the industry's new planes that have been suggested.

Douglas has spent about \$3 million in testing and development of the Super DC-3. The company is expected to turn out about 10 of these planes a month.

### PAA Crash Report

Crash of a Pan American Airways Convair-Lear at Ranchi Bay Area Air Port, Havana, Cuba, during takeoff last Dec. 9 was probably caused by the crew's inability to stop the plane under marginal conditions of stopping distance due to inadequate braking of lockers.

The finding was made in a severely worded Civil Aeronautics Board accident investigation report. Although the plane was damaged extensively, only one of the 44 persons aboard was injured in the accident.

► **Varsi Slow**—During the takeoff the crew slowed on several vibrations at an approximate speed of 95 knots and immediately throttled the engine and applied brakes. The left outboard and right outboard tires blew out within 550 and 250 ft, respectively, after the brakes were applied, and the plane failed to stop within the required distance.

Test of a similar airplane using the same outboard and tail assemblies revealed no unusual vibration. Investigation disclosed no cause for the reported trouble. Maintenance was satisfactory and weather was not a contributing factor.

The Convair-Lear involved was equipped with Hamilton Standard propellers with the automatic torque main cooperative. In the earlier CAA test conducted the plane for such operation over the water.

Examining all the evidence from the accident investigation, together with tests obtained through dry testing operations, Pan American concluded that "the braking system of the Convair-Lear is critical under certain operating conditions."

► **New Rules**—As a result, FAA changed regular requirements for a regular modification. High-capacity brakes under test at the time of the accident (although not installed on the plane involved) are now required on Pan American's Convair-Lear.

These high-capacity brakes retain their braking effectiveness better under increased heat. PAA also enlarged its pilot training curriculum to include checking each pilot in actual use of the air brakes.

### Employee Rights

Passion and certain other supervisory employees of airlines have been granted the same right to organize and bargain collectively as similar workers on airlines.

In a precedent-making decision, the National Mediation Board upheld the claim of the International Assn. of Machinists that 57 supervisory employees in Northwest Airlines' mechanical department were entitled to form a bargaining unit.

NMB denied Northwest's contention that the Board had jurisdiction. NWA argued that persons elected were officials and didn't come under the Railway Labor Act.

In disagreeing, the Board based its ruling on two main points. Workers involved worked under the management hierarchy, and they lacked the authority to initiate or change company policy. "This job is to carry out policies laid down by management," the Board said.

### Nonsked Suit Grows

Two nonscheduled carriers, Air Transport Associates, Inc., Seattle, and Golden State Airways, Fairbanks, Alaska, have asked the court in the suit filed last April by SSW, Inc., Concord, Calif., leather airplane operator, against 12 certified airlines, the Air Transport Assn. and the Air Traffic Conference of America. The suit (American Wings, Apr. 11) asked for \$1.5 million damages and an injunction to prevent the defendants from engaging in a conspiracy to restrain interstate commerce violating anti-trust laws.

### Star Route Bids

Detailed information on how to bid for contracts covering new air star route authorized by newly-enacted legislation is now available from the office of Robert E. Burges, deputy assistant postmaster general, Post Office Department, Washington 25, D. C. Air Star Route Line, B.R. 4495, Public Law No. 277, 81st Congress, was signed by the President last week. The law provides that the postmaster general may award air star route contracts whenever he finds it is in the public interest "because of the emergency or inadequacy of surface transportation and where the cost is reasonably comparable with the service to be provided."

### Central Ups Fleet

Central Airlines, Fort Worth, has ordered three more multi-engine Beech Bonanzas for use on its low-cost routes in Texas, Oklahoma, Arizona and Kansas. The carrier, which began service last month, previously had bought eight Bonanzas (Aviation Week, Aug. 22).

### FLEXLOC

SELF-LOCKING  
NUTS

FOR THE  
AIRCRAFT  
INDUSTRY



Whether it's mass production of popular light planes, air transport, or building of experimental planes for the Army and Navy, reliability of construction is a must. FLEXLOC with its resilient, flexible segments completing the "self-locking" feature, won't shake loose even under the most shattering vibration. And FLEXLOC has unusually uniform torque—within a few "lock lbs.". Made in one solid piece, FLEXLOC is a snap, a lock and plain nut all in one, and is available in "thin" types as well as the "regular"—in NC and NF thread series.

ACCEPTED: FLEXLOC is actually approved and accepted by most U.S. Departments, Federal agencies, and the OCA.

Write for your copy of the FLEXLOC Catalog.

**SPS**

STANDARD PRESSED STEEL CO.

BOX 579, JENKINTOWN, PENNSYLVANIA

"Being Brought Into Line With The New Industrial Standards"



Read this  
carefully. This  
is the  
new  
flexible  
fueling  
system.

BACKED BY  
NATIONWIDE  
SERVICE



### Higher Speed Fueling with LOWER PRESSURE

For safe and fast refueling install Wayne College-A-Mass System. Adaptable to Truck Tank, Fixed Field, Apron or Hydrant installations. Write for new, complete engineering booklet.



THE WAYNE PUMP CO., PO BOX 140, INC.  
4000 Pennsylvania Street

Please send booklet describing Wayne College-A-Mass System for fast, safe refueling.

NAME \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_







**90% OF JET  
AIRCRAFT  
MANUFACTURERS  
USE Refrasil**  
HIGH TEMPERATURE,  
LIGHTWEIGHT, INSULATION

### 8-36 Largest Bomber

### F-86 Fastest Record

### XF-85 Smallest

FOIING 8-47

CRANICE VOLONTI F-40

CONSOLIDATED B-34, 11-94

10-20-2010 2:00

MOTION 59-10

MILWAUKEE 11-85

NORTH AMERICAN F-35, B-45

NOVEMBER 2007

COUGLAS O-558-T, D-558-T, W1-30



Typical critical blanket construction for tail cone of Jet Aircraft. Smaller engine blanket as used on turbine cone.

**R**EFRASIL is high temperature, lightweight insulation. Withstands sustained temperatures up to 1800°F and flashes up to 2600°F. Easy to install and remove. This hard to beat combination makes REFRAFIL **FIRST** in the Jet Aircraft Insulation Field.

Customer Support  
 1000 W. Hubbard Blvd.  
 #700 Minneapolis, MN 55401  
 612-338-2200

To Order:  
J. Lawrence Green  
3808 Schubert Place  
Seattle 23, Washington



Call or visit today for further information

RE "HEALTHY" ...  
THOMPSON

THE H. L. THOMPSON CO.

Rept. A, 1783 Caroline Desert  
Law, Graham T. Cold, M.D.

## WHAT'S NEW

### Trade Literature

"How Canolite Uses Liquid Erolite," a picture story of peelable protective plastic coatings utilized in the fabrication of aluminum and the protection of spare parts, available upon request to Better Finishes and Coatings, Inc., 266 Doremus Ave., Newark, N. J.

"Power Densit," a bulletin on new ratings, double-acting air cylinders, available on request to W. C. Richards, R., The Bellows Co., 212 W. Market St., Alton, Ohio.

**"Don't Fear Threading of Stainless,"**  
actual case studies, gaging speeds, tool  
angles, coolants and other pertinent  
data available on request to The Cooper  
Alloy Foundry Co., Telford, Pa.

New bulletin on light machine duty belt booster, FlexGrid belt conveyor, portable elevated belt booster, Double Flex chutes and new conveyor are available on request to Island Equipment Corp., 2701 Brady Plaza N., Long Beach, CA 90801.

\*Bulletin No. 1,\* on west rope under test in the vibrations of west rope is available on request to West Rope Institute, Sheehana Building, Woking town, D. C.

Catalog covering a wide variety of pumps and screwdrill flow instruments and control valves is available on request to Fisher and Porter Co., 30 County Line Road, Hingham, Penn.

"The V.I. Story," a book by David O. Wines, covering the history and purpose of various institutions, their origin and development, and their use in rotating appliances, transformations.

cables, power distribution systems, and  
the controls. High-current inspection  
and electronic equipment. Available on  
request to National Electrical Manu-  
facturers Assn., 155 East 44 St., New

**Booklet on** Snow-duty antide-  
pressants, containing detailed information  
on special mechanical features, is avail-  
able on request to Dush, Machine Spr-

Booklet D8-79-021, describing standard and high-voltage vacuum rectifiers for power supplies and electronic instruments, is available from Mullard.

## ADVERTISERS IN THIS ISSUE

AVIATION WEEK—OCTOBER 17, 1945

[illegible]

## Mr. Dewey, Fearless Protector?

The New York state law enforcement machinery is identically efficient in some places. State troopers bear down on motorists for a variety of prescribed reasons. But if you are a non-striker attempting to go to work at the struck Bell Aircraft Corp. plant outside the city limits of Buffalo we wouldn't give you a plugged nickel for your chances of protection.

You may not even be eligible for a union. Maybe you are a Bell executive or an engineer. If so, the chances are that you have already had several very fast runs at the company gates through a barrage of clubs and streams and fets. Maybe you were knocked out cold. This has happened to numerous passing motorists, whose cars have been overturned, to bus passengers—both workers and non-workers—and the drivers. Property damages to non-participants have amounted to thousands of dollars.

A shrewd and an unshrewd kind of deputies has been helped to maintain order during any of several serious outbreaks. President Lawrence Bell has used New York's Governor Dewey repeatedly urging a sufficient force to maintain order. To this date the governor himself has yet even to acknowledge these appeals, let alone take any definite action or explain why he refuses. Acknowledgments have been dispatched, at a best, but by understlings, in the meaningless jargon of bureaucracy. Meanwhile, several motorists finally were slain, but the next day the judge, a member of the state's Supreme Court, received telephoned threats at his house.

With this kind background, all of which—and much more—can be documented, it is encouraging to find one newspaper recognizing the public danger, and pointing out this strange inactivity of a governor who made his big bid for votes originally as a fearless protector of the citizenry. In a related editorial, quoted below, the New York Sun says:

### DISPARITY AT PEESKILL AND BUFFALO

Something is definitely wrong about these two places. The one shows 1938 deputy sheriffs and 200 state troopers prowling under at the Hallow Brook Country Club near Peekskill on September 4 when a militant and unscrupulous group of left-wingers went there to protect Paul Robeson, who was giving a concert, and his Communist cohorts.

The other shows a handful of deputy sheriffs assembled last week at the Bell aircraft plant in Buffalo to protect non-strikers from violence at the hands of strikers. At Peekskill

a proper show of force did in fact maintain order until the concert was over. Afterwards groups of idle citizens threw stones at departing automobiles and a good many left-wingers got hurt.

At Buffalo the strikers panted hard upon the necks of deputies, beating stones and sticks over their heads. By the time tonight's bomb had dispersed the pickets no fewer than 25 deputies had been injured, to say nothing of a number of other private citizens whose only offense was that they were going when they lawfully had a right to go to their jobs.

The alias at Peekskill had been advertised well in advance. The alias at Buffalo was but one in a series of custom specialties of which all motorists from Governor Dewey on down had ample notice. This newspaper is utterly opposed to such law. We believe in the duty of state, county and municipality to keep roads free from Communist and to keep Communists from striking citizens. We believe it wrong for pickets to chase auto-drivers and for non-strikers to chase pickets. What we cannot understand is the disparity in measures taken to maintain order at Peekskill and at Buffalo. It is high time for somebody in authority to do a lot of explaining.

High time, indeed! Sometimes we feel that the American people cry out for at least a few public officials with guts. We think this is one of those times. Mr. Dewey may believe he is restoring the pack and the labor vote. He should forget about the packs in their present numerical strength. And he ought to know that the respectable elements of labor never countenance disorder and law-breaking. Certainly, a coldly practical politician should worry at least about the much more numerous votes of the law-abiding contingents of the public who if he is unconcerned about the voters themselves.

Maintain order Mr. Dewey

## More Contracts Released

An editorial on this page Oct. 3 announced that the Air Force had begun releasing to American War Reliefs of negotiated contracts of \$100,000 or more. We also said that information concerning negotiated contracts under \$100,000 had been granted, but had not been forthcoming. The Air Force since Oct. 3 has fulfilled its promise, and readers will find the latest list of negotiated contracts starting on page 41 of this issue. We thank the Air Force for its cooperation in making such vital information public to the taxpayers.

ROBERT H. WOOD

# Bendix Products Division

## FIRST IN

## FUEL METERING

## Specialists in Bringing Blue Sky Down to Earth...

Translating the blue sky of paper theories and rough designs into the solid fact of steady production and proven performance is all part of the day's work for the engineers at Bendix Products. Whether it is the development of rugged landing gear to handle heavier loads and higher speeds or a complete fuel metering system for the newest jet, the problem is analyzed, engineered and produced

with a consistent efficiency that comes only from experience. Here, are the men and machines that have over the years furnished the landing gear and fuel systems which help American aviation lead the world. Engine builders and aircraft manufacturers are urged to list this matchless combination of design and production experience help solve their problems. Inquiries receive same of late attention

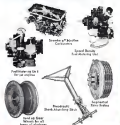


## LEADER IN

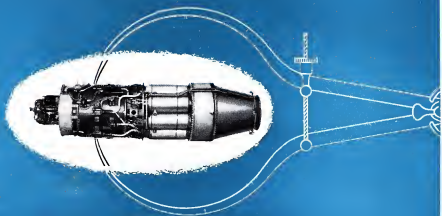
## LANDING GEAR

BENDIX PRODUCTS DIVISION of  
MOTOR CITY, MI, U.S.A.

Plant: Bendix, Incorporated, Buffalo, N.Y. Also: New York, N.Y. 10017







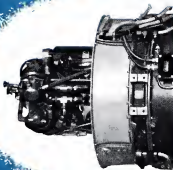
### **SAVES SPACE**

*Allison provides 5,000 pounds' thrust in a smaller diameter than any other engine.*

#### **Allison jet-powered airplanes:**

Lockheed F-80 and TF-80 Shooting Star  
 Republic F-84 Thunderjet  
 Grumman F9F-3 Panther  
 Northrop F-89A Scorpion  
 North American FJ-1 Fury  
 Lockheed F-94  
 Consolidated XP5Y  
 Northrop RB-35B Flying Wing  
 Martin P4M-1 Mercator  
 North American AJ-1

*J35 Axial-flow Turbo-Jet*



# *Allison*

*Builder of axial and centrifugal flow turbine engines*

**DIVISION OF**



**Indianapolis,  
 Indiana**